MINING WORLD

in this issue

Dredging Idaho Monazite, Page 26

EIMCO

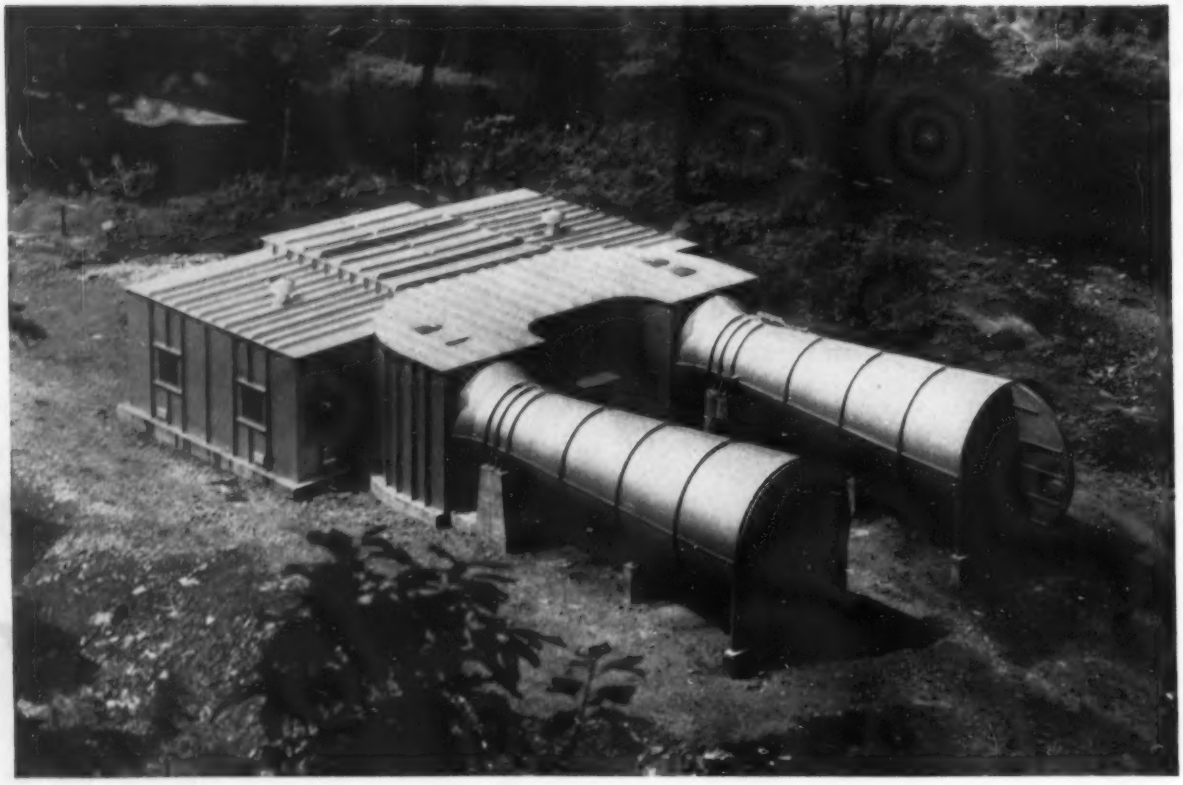
EIMCO LOADERS in drawpoint mining systems enable this customer to load 16 to 18 tons per man shift including all mine personnel. Eimco loaders will cut costs for you. Write for information.

THE EIMCO CORPORATION
Salt Lake City, Utah, U.S.A.
Export Office: Eimco Bldg., 52 South St., New York City

FEBRUARY, 1954

Vol. 16 No. 2

35 cents a copy
in sterling 3s



The lungs that breathe in tons

This coal company in West Virginia wanted the air in its underground passages safe and pure. Jeffrey engineers inspected the mine, designed these giant Aerodyne fans. 36,000 *tons* of air per day are circulated through the mine on a 10-mile trip, 1000 feet deep. This is 6 times the weight of the coal the mine produces! Big custom jobs like this are a constant challenge to "The Team That Gets Things Done"

. . . that's JEFFREY!

***THIS** IS JEFFREY, TOO!*

COUPLING LINK AND BLOCK

"A chain's no stronger than its weakest link" doesn't quite tell the story. Modern industrial chains have attachments of many types, like this coupling. It's one of the millions of replacement parts Jeffrey makes each year—with the same precision found in its largest machines.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

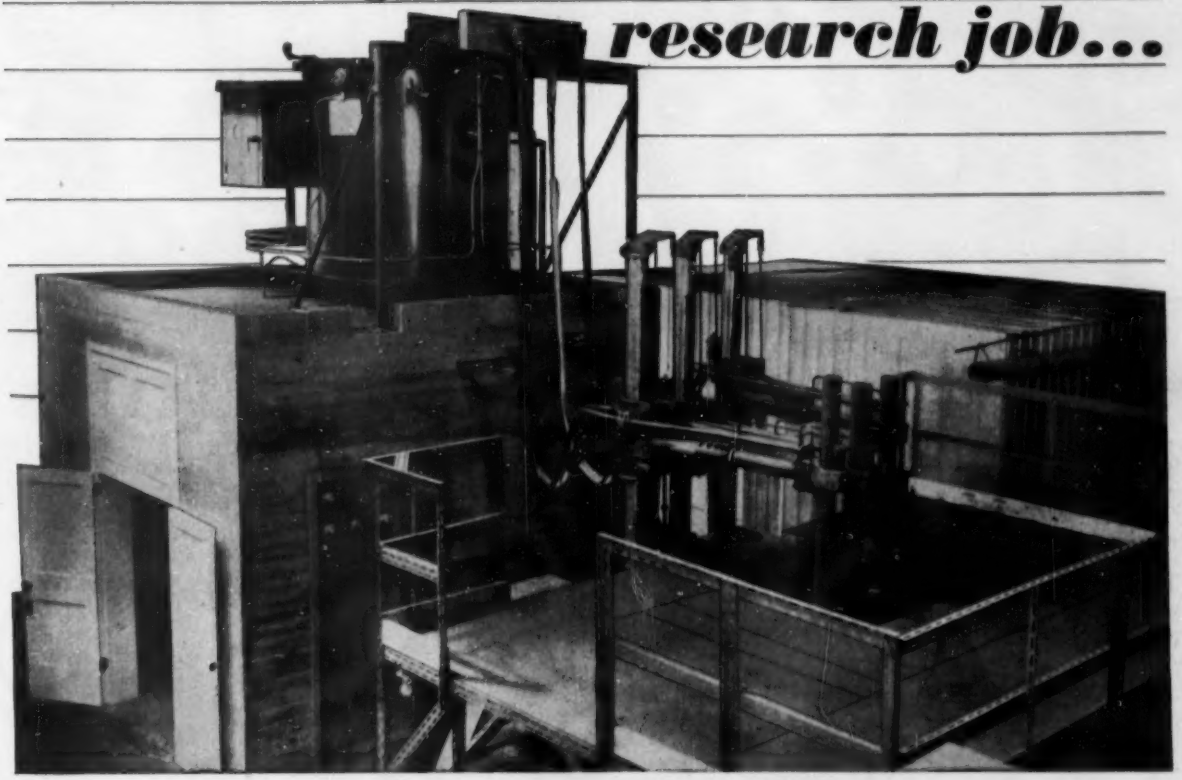
Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
. . .IT'S A JOB FOR JEFFREY!

*Lectromelt** goes to Canada on a research job...



...Department of Mines & Technical Surveys installs 200KVA Lectromelt Furnace for experimentation

Cheap electric power and plentiful mineral resources have led to Canada's exploration of the economies and efficiency of electric smelting. A laboratory has been set up to test high temperature smelting and to determine whether more desirable products can be obtained more practically by using electric furnaces.

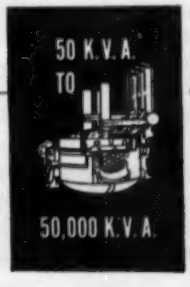
Highly satisfactory results already have been obtained in test production of ferroalloy-type material, according to the Division Chief heading the laboratory.

It is anticipated that certain ores will be smelted experimentally to obtain informative data on costs and chemical reactions encountered. Also, the smelting problems of various refractory materials will be investigated.

Expectations are that the cost of the pilot laboratory will be insignificant compared with the economies and material improvements that will result from this Canadian research. Perhaps you could benefit similarly by installing comparable research facilities.

Lectromelt Furnace engineering assistance is always available to you. Write on any problem. Also write for Catalog No. 105 which describes many types of Lectromelt Smelting and Refining Furnaces, and their versatility. Pittsburgh Lectromelt Furnace Corporation, 324 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya



MOORE RAPID

WHEN YOU MELT... *Lectromelt*

*REG. T. M. U. S. PAT. OFF.

High in mountains near Poncha Springs, Colo., this Caterpillar D6 Tractor with No. 6A Bulldozer, owned by Reynolds Mining Corp., constructs a new fluorspar settling pond. Fluorspar will be used in Reynolds' Alexander, Ark., aluminum plant. Across valley are beautiful Collegiate Peaks, near famed Leadville mining district.

— ON TOP OF THE WORLD...ON TOP OF THE JOB

Even in tough going like this, the Cat* D6 Tractor stays on top of the job. At about 8,000 feet altitude, it 'dozes rocks and dirt—much of the latter frozen—in temperatures that range from summer heat to far below zero.

High altitude is a difficult test of an engine, but the rugged Caterpillar-built Diesel Tractor delivers plenty of power to do rough jobs fast. It's built to keep working for you for many thousands of hours without down time or tinkering, thanks to sturdy construction, specially hardened cylinder liners, long-wearing aluminum-alloy bearings, and efficient oil and air filtration.

The versatile No. 6A angling blade can drift material over banks as well as do straight 'dozing. Scientific curving of the moldboard permits big, rolling, fast-moving loads. This means you get more work per hour—*more work per dollar*—from a Cat-built Bulldozer.

Many jobs around mines are equipment-busters. That's why you need the extra, built-in *toughness* of Caterpillar machines. Your Caterpillar Dealer will gladly show you, on the job, the tractor and matched bulldozer that will do most for you at lowest cost. Your dealer backs his products with fast, skilled service and genuine factory parts.

Caterpillar Tractor Co., San Leandro, Cal.; Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

MINING WORLD

Including the Export Edition **WORLD MINING**

Published monthly except in April when publication is semi-monthly

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COVER CIRCLE: Yuba dredge, No. 106, originally built for gold recovery is now operated by Baumhoff-Marshall, Inc. to recover monazite in Idaho's Cascade Valley.

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WORLD MINING is published the 26th of each month as a regular department of MINING WORLD and is also circulated as a separate publication on a carefully controlled free basis to a selected list of management and supervisory personnel associated with active mining enterprises throughout the world.

Mine Vent TUBING

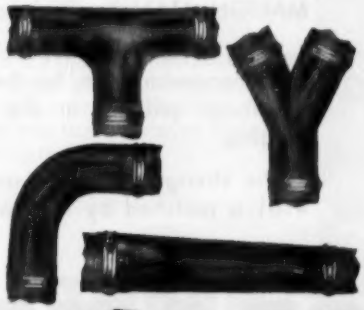
makes plenty of fresh air at the working faces a Reality . . .

At a moderate cost, including installation, you can make your ventilation system *complete* with MINEVENT TUBING. The returns in greater output per man will repay the investment many times over.

MINEVENT TUBING delivers fresh air, without waste, to the men who need it. Installation or removal are dead easy with patented couplings and hangers. Standard accessories, shown below,— "Ts", "Ys", "Ls" and reducers — make MINEVENT TUBING adaptable to all conditions. Thus rugged tubing is fungi and leakproofed. It's flexible, withstands repeated handling, and cannot collapse during operation. Three grades: sizes 8" to 36".

ABC JUTE BRATTICE CLOTH is the durable material for sealing off inactive areas and directing fresh air to the men who are working. Properly treated to resist flame, fungi, shrinkage and leakage. Made in two grades.

Write for ABC samples and full information.



AMERICAN BRATTICE CLOTH CORP.
WARSAW, INDIANA

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STAMINA IN ACTION!

MARION 4161

"Smooth — fast — lots of life." These are comments of operators on a fleet of seven MARION 4161 shovels in an eastern mine.

They could add "dependable—powerful—and economical" too, for the 4161 is famous for these qualities in the world's hardest digging.

The strength designed and built into the 4161 is matched by its Ward-Leonard Electric power. With Amplidyne or Rototrol controls, it has small-machine speed with big-machine output. Protection against overload is automatic.

You can pay more, you can pay less, but you can't buy more machine value anywhere if you need production, dependability and low-cost operation in hard digging. Ask for Bulletin 394.

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

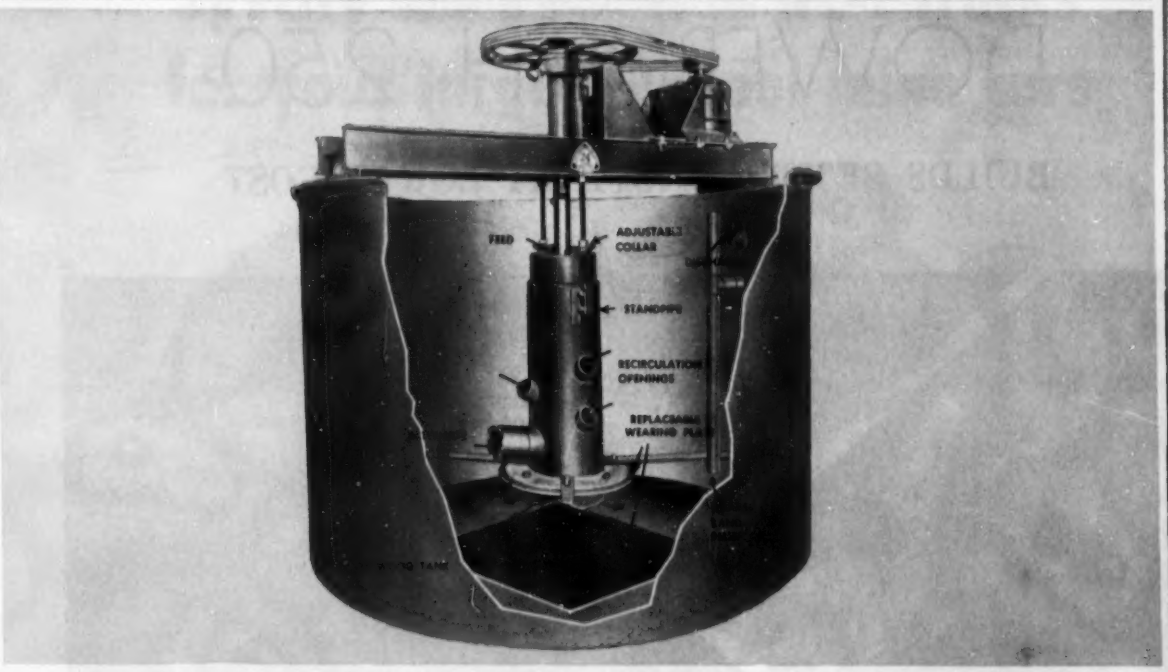
MARION 70 YEARS PIONEERS

from ¾ cu. yd. to 45 cu. yds.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

DENVER PATENTED SUPER AGITATOR & CONDITIONER

Complete Milling Equipment—from testing, to feeder, to dryer!



This cutaway photograph shows clearly how complete, high efficiency conditioning is possible in Denver (Patented) Super Agitators and Conditioners. All feed and recirculated pulp is accurately controlled through the Patented Standpipe and goes directly into the intense agitation zone of the propeller.

Conditioning Is Thorough, Short Circuiting Is Eliminated By Patented Standpipe In Denver Super Agitators

Flotation recovery and profits increase substantially when pulp is conditioned thoroughly—each pulp particle must be intimately mixed with reagents. Denver Super Agitators and Conditioners give you this necessary, thorough conditioning because of the patented standpipe feature.

All feed must pass down the standpipe and directly through the intense agitation zone of the propeller. You get positive conditioning that completely eliminates the short circuiting found in open propeller types. This positive, intense agitation gives you the high conditioning efficiency essential for maximum flotation results and profits.

PATENTED STANDPIPE

Feed enters the standpipe either through the top, or through an alternate feed inlet in the lower end of the standpipe. (The low, alternate feed inlet permits feeding the pulp from one conditioner to another, on the same level, without pumps.) Pulp is positively and accurately recirculated by adjusting the patented weir collar around the top of the standpipe or through adjustable recirculation openings on the outside of the standpipe. Thus all feed and recirculated pulp goes from the standpipe directly through the propeller zone.

NO SAND-UP ON SHUTDOWNS

A patented, replaceable Decolloy hood on the bottom of the standpipe, directly over the propeller, improves agitation efficiency and prevents sand from settling around the propeller on shutdowns. All enclosed, heavy-duty, anti-friction bearing shaft assembly gives long service. Motor drive and mechanism are mounted on ridged, beam type superstructure. Sizes from 3′x3′ to 20′x20′

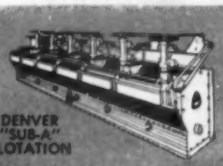
Write or wire today. Find out how more complete conditioning of your coarse, high specific gravity flotation pulps will increase flotation recovery and profits—when you use a Denver Patented Super Agitator and Conditioner.

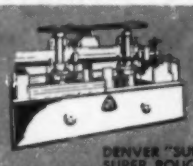
Free Technical Bulletin Sent on Request

Over 25 years of Flotation Engineering

DENVER EQUIPMENT COMPANY

1400 SEVENTEENTH ST. DENVER 17, COLORADO


DENVER "SUB-A" FLOTATION


DENVER "SUB-A" SUPER ROUGHER FLOTATION MACHINE

DENVER SUPER AGITATOR AND CONDITIONER

DENVER "SUB-A" UNIT CELL

DENVER DIAPHRAGM PUMPS

DENVER DILLON SCREEN

DENVER DISC FILTER

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DENVE STEEL HE ROD MI

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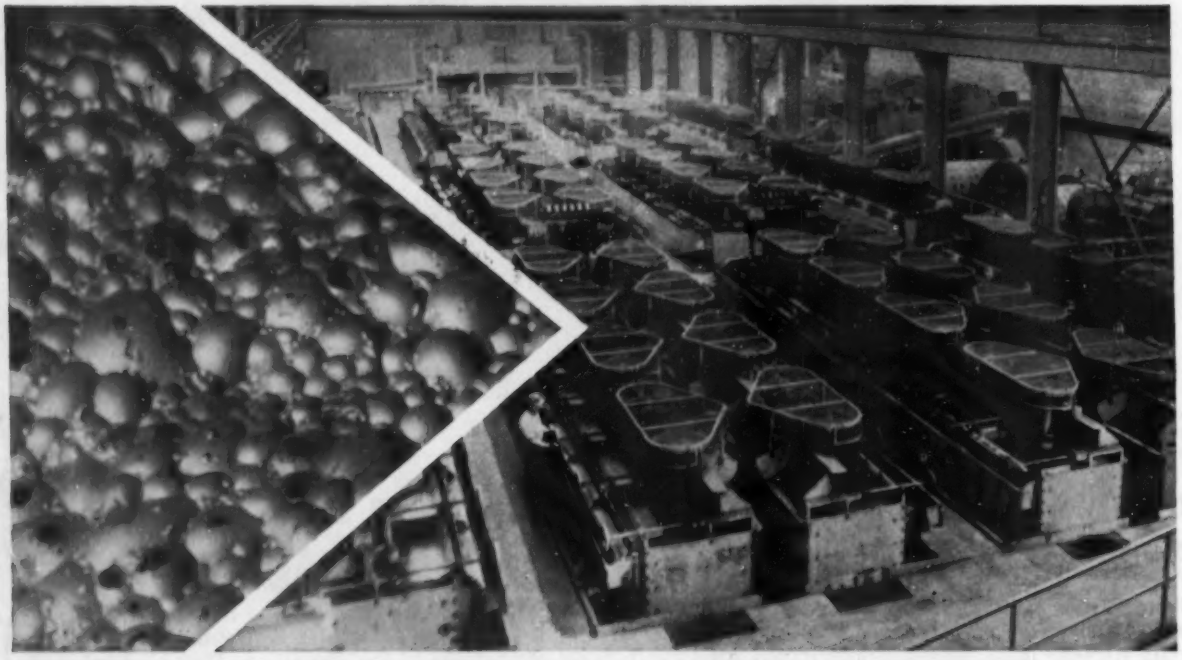
DOWFROTH 250

BUILDS BETTER FROTH AT LOWER COST



This quality frothing agent by Dow raises concentrate grade and increases recovery —with less frother consumption!

Dowfroth® 250 in many mills today is producing improved metallurgy with as little as one-fourth the consumption of previous frothers used. These are not just laboratory tests, but full-scale mill results. This could mean increased profits and lower operating costs in *your* mill, too.

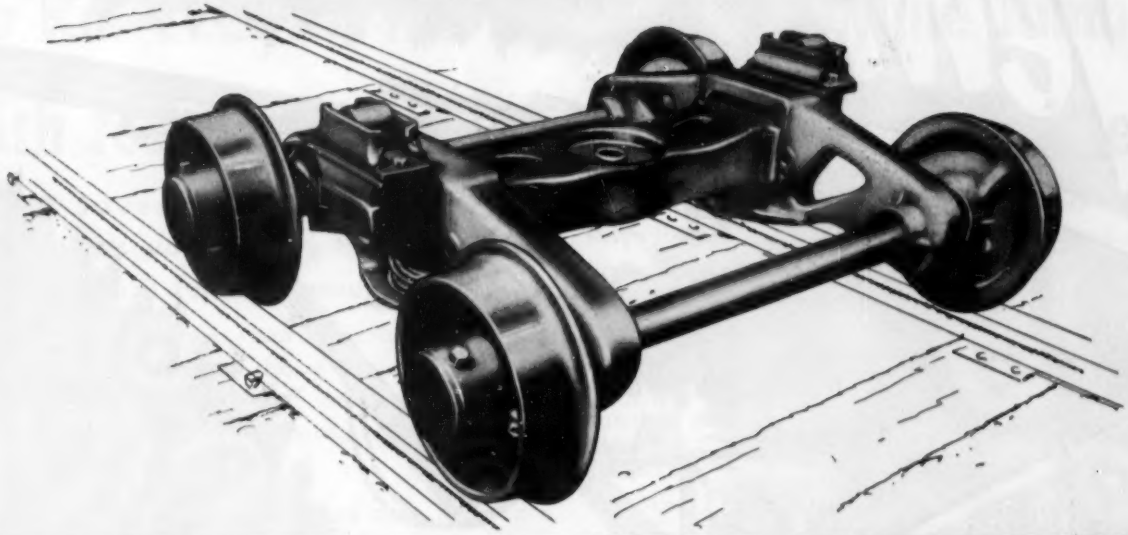
Dowfroth 250 is easy to use—requires minimum conditioning for stage addition. Its water solubility permits accurate regulation as a water solution if you prefer this method. And it demonstrates little or no collecting power, which allows your operator to regulate frother and collector independently. This hard-working frother by Dow also spares the rubber covered parts on your flotation machines—shows minimum swelling and deterioration to save you money in maintenance.

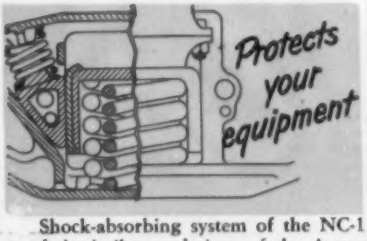
Prove the economy and efficiency of Dowfroth 250 in your own mill by using a test sample with our compliments. Write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 834K.

you can depend on DOW CHEMICALS

DOW

Specify NATIONAL NC-1 trucks for your large 8-wheel mine cars

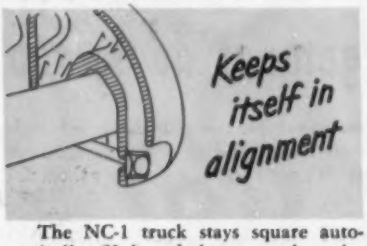




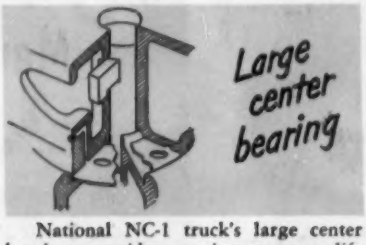
Shock-absorbing system of the NC-1 truck is similar to designs of the American Association of Railroads for full-size freight car trucks. The oscillation control mechanism (see cutaway) floats your loads over the tracks.

Track irregularities are no hindrance to higher speeds for mine cars when they are equipped with National NC-1 trucks. Truck design and large diameter, low stressed, load-carrying springs improve riding qualities.

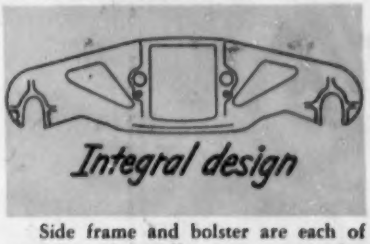
Removal of bolt at each end of side frame permits quick wheel and axle assembly change. Cuts repair time and costs . . . keeps cars in operation longer. No lengthy tie-ups for wheel and axle changes on a National NC-1 truck.



The NC-1 truck stays square automatically. V-shaped slots over the axles make it impossible for the truck to get out of square without lifting entire weight of the car body and lading—means longer service, less repairs.



National NC-1 truck's large center bearing provides maximum wear life by reducing per-square-inch loading . . . provides bolster stability. Has easily replaceable centerplate shims and adequate provision for lubrication.



Side frame and bolster are each of one-piece, integrally cast construction similar to the National C-1 trucks used on railroads. Gives maximum strength, minimum weight—has *no welds or rivets to shake loose.*

A-9939

For minimum maintenance time and spillage, plus maximum equipment protection—specify National NC-1 trucks on your next 8-wheel mine car order.

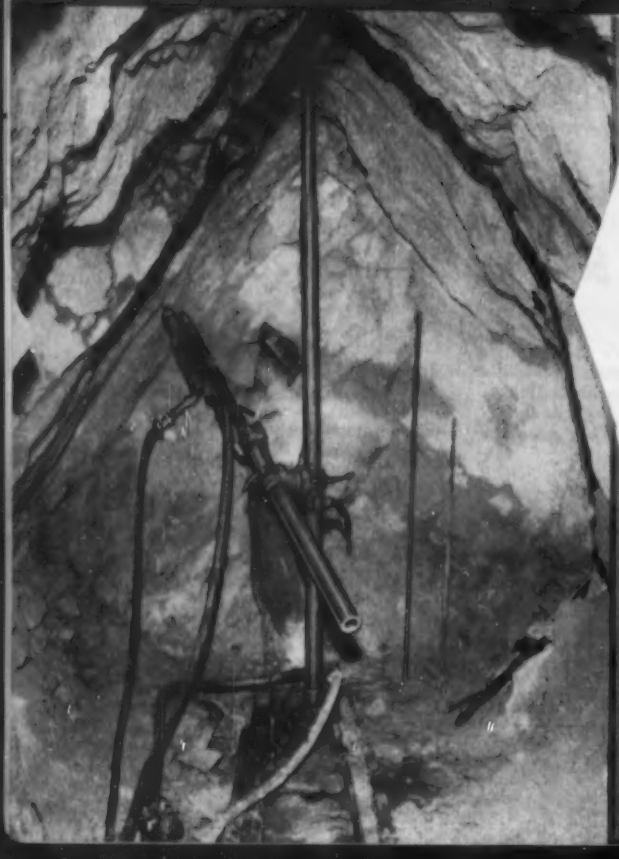
NATIONAL Products FOR TRANSPORTATION AND INDUSTRY

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

Willison Automatic Couplers • Friction & Rubber Draft Gears • Car Trucks • NACO Steel Wheels • NACO Steel Links & Swivel Hitchings

New! Speeds up



Miners like Le Roi-CLEVELAND HC23RW Reverse Air Feed Drifters

Management does, too

Faster Steel Changes! No swing or dump nuts to loosen and reset. Your miners simply swing drifter on feed cylinder and change steels. It's not only easy — it lets them drill out the round faster.

No Stuck Steels! Positive air feed keeps drills working at peak efficiency, avoids stuck steels.

Higher Drilling Speeds! Positive air feed plus proper force of blow and strong rotation give faster drilling speeds with both steel and tungsten carbide bits. You get longer bit life, too, and drill more footage.

Low Upkeep Cost! No feed screws or feed-screw nuts to wear. No complicated power-feed mechanism to give trouble.

Easy to Operate! Built to lighten the load on your miners. Feed controls conveniently located. Reverse air feed withdraws steel from hole quickly.

Faster Set-ups! The combination of Le Roi-CLEVELAND Air Feed Drifters and air columns gives you a unit that can be set up easily and quickly. And you can get the air column in any height you want.

drilling cycles

Le Roi-CLEVELAND *self-leveling* Mine Jumbo with four-foot steel-change Air Feed Drifter

Saves time drilling lifters! Lets your miners drill the right round for any ground!

You couldn't ask for more from a mine jumbo than the performance you get from this new Le Roi-CLEVELAND. It's got plenty of stuff. And the payoff for you is faster cycles, greater tonnage per man-shift, lower costs! Here's why:

Self-leveling, air-motor-powered arm, lets miners spot and space holes quickly and easily, for the most efficient fragmentation. They don't have to loosen a bolt or tilt a boom, to complete the drilling cycle.

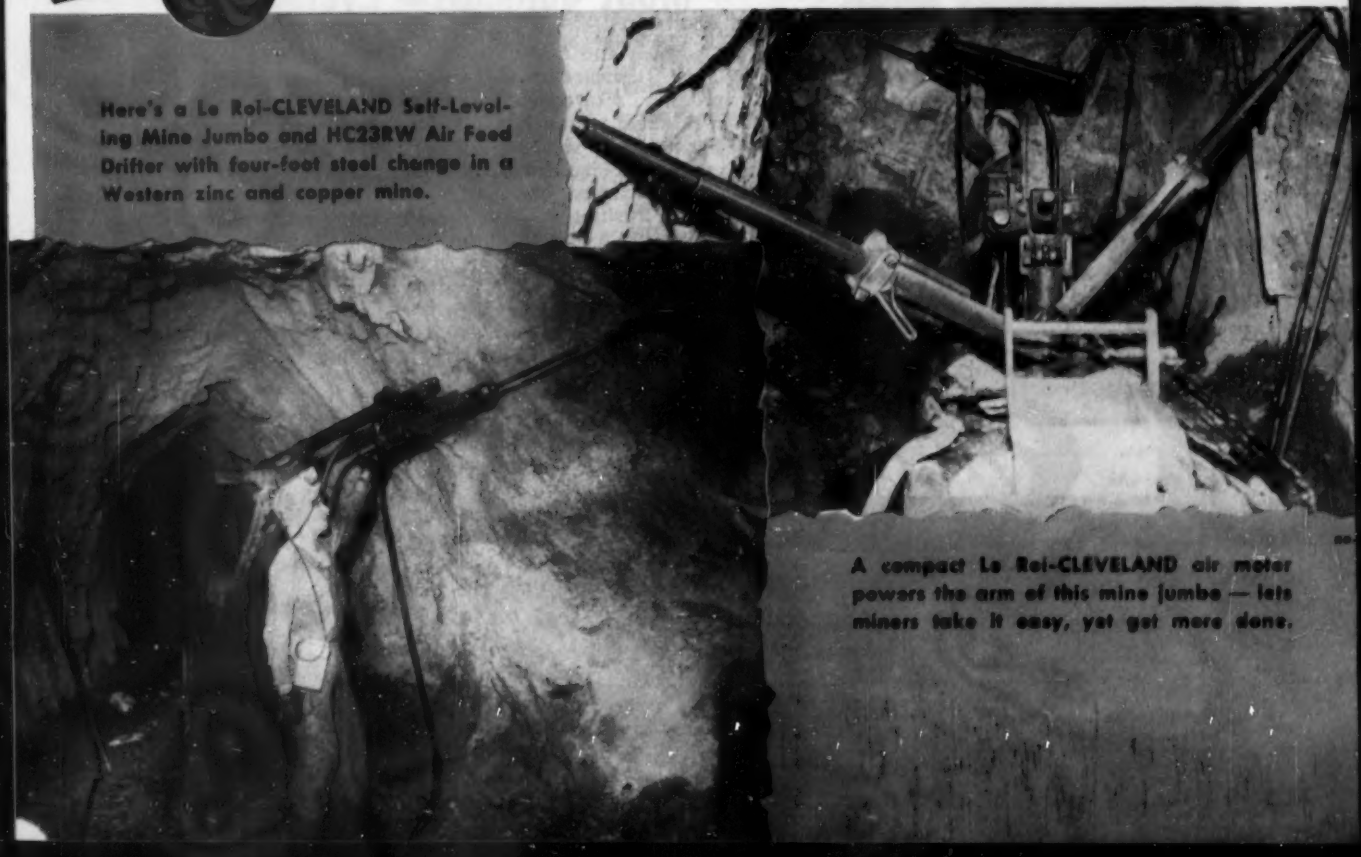
Exclusive rigid screw and gearing mechanism keeps the heading straight, cuts down overbreak and underbreak. Keeps the drifters in line, prevents the steel from binding, reduces chuck wear.

Offset arm provides plenty of clearance to drill lifters — without having to take time out to swing the drill under the arm.

You can get this Le Roi-CLEVELAND Self-Leveling Mine Jumbo in either single-arm or double-arm construction. Write for further information and see for yourself how either model can help you get more done every shift.

LE ROI COMPANY

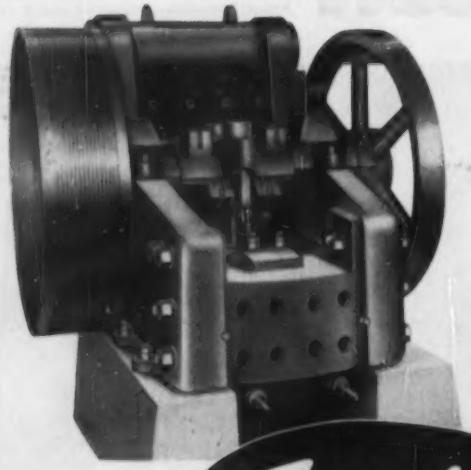
CLEVELAND ROCK DRILL DIVISION
12300 Berea Road, Cleveland 11, Ohio
Plants: Milwaukee, Cleveland and Greenwich, O.



Here's a Le Roi-CLEVELAND Self-Leveling Mine Jumbo and HC23RW Air Feed Drifter with four-foot steel change in a Western zinc and copper mine.

A compact Le Roi-CLEVELAND air motor powers the arm of this mine jumbo — lets miners take it easy, yet get more done.

ENGINEERING SIDELIGHTS OF GRAND COULEE DAM: *Pictures fail to show the true size of this massive dam and power plant. It is the largest concrete structure in the world. For comparison, the central spillway is twice as high as Niagara Falls and the crest of the dam is over 3/4 of a mile long. Being a gravity dam, Coulee depends on weight alone to prevent the Columbia River from shifting it from its granite base. The dam contains about 10 1/4 million cubic yards of concrete and weighs about 22 million tons. In fact, Coulee is distinctive for its bulk and stands out as the most massive construction feat of all time.*



Traylor Type S Jaw Crusher Most Massive Ever Built

Designed and built for BIG production, the largest Type S crushes up to 1,000 tons her hour of an 11" product. For comparison, it could crush a volume of rock equal to the 22 million tons of Grand Coulee in 131 full work weeks. But big production depends on more than size alone. The Traylor Type S features original curved jaw plates which apply power as a direct crushing force to reduce lifting and churning . . . assure a more uniform product with less wear on plates. In fact, Traylor curved jaw plates outlast ordinary plates 3 to 1. See the massive construction . . . exclusive design features of the Traylor Type S Jaw Crusher. It's completely illustrated and described in Bulletin 125. Send for your free copy today.

Made in 7 sizes with feed openings from 36" x 42" to 60" x 86".

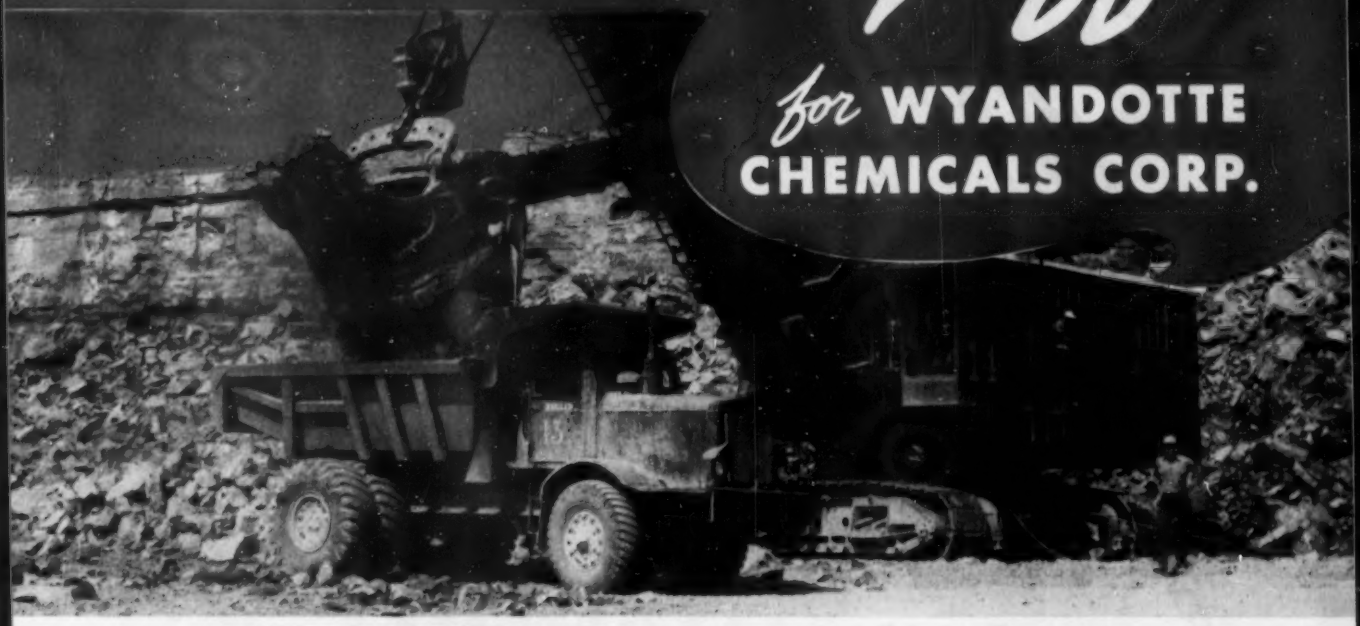
Traylor

TRAYLOR ENGINEERING & MFG. CO.
613 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
CANADIAN MFRS: Canadian Vickers, Ltd., Montreal, P. Q.

Primary Gyratory Crushers | Rotary Kilns | Secondary Gyratory Crushers | Ball Mills | Jaw Crushers | Apron Feeders

"Eucs" Pay Off

for WYANDOTTE CHEMICALS CORP.



22,000 hours...still going strong!

At Alpena, Michigan, Wyandotte Chemicals Corp. operates one of the world's largest limestone quarries—another job where "Eucs" are paying off in more loads per hour at less operating and maintenance cost.

Seven years ago Rear-Dump Euclids of 22-ton capacity replaced an electric haulage system for moving rock from the quarry face to the plant. Loaded with stone by shovels of 5 and 6 cu. yd. capacity, and hauling overburden during the winter months, these fourteen "Eucs" have worked an average of 22,000 hours each. On a two mile round trip haul, each "Euc" delivers approximately 75 tons per hour for a total of more than 3 million ton-miles per unit.

Wyandotte standardized on Rear-Dump Euclids because of their job proved dependability on hundreds of mine and quarry operations. Performance records prove this decision has paid off because "Euc" speed, capacity and efficiency have increased production and lowered hauling costs at Alpena.

Your nearby Euclid distributor will be glad to discuss your off-the-road hauling problems and show you how and why "Eucs" can do a better job for you.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

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Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

To Increase Your Tonnage
On Every Blasting Job

Thor

offers a Complete Selection of
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STOPERS

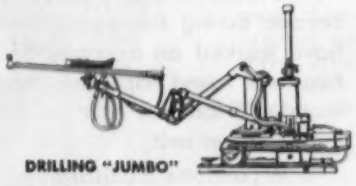
SINKER ROCK DRILLS

SUMP PUMPS

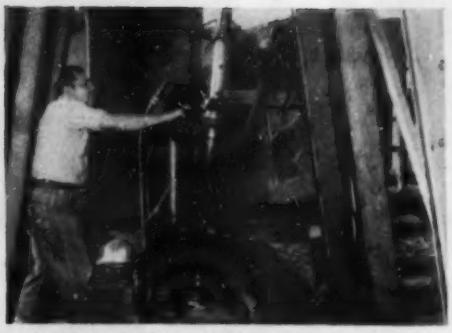
DRIFTERS

Thor Rock Drills, famous everywhere for power and durability, give an extra bonus of rock penetration when used with the new Thor air feeds—legs, bars, shell motors and the great, new track-mounted "Jumbo". For greater footage, lower air and maintenance costs, and all-around satisfaction, use Thor mining equipment. Ask your Thor distributor for a demonstration, or write for free catalog.

SINKER LEGS



DRILLING "JUMBO"



THOR DRILLING "JUMBO"—A completely modern, track-mounted carriage for speeding drifting and tunnelling operations. Air-operated roof-jack, boom, feed motor and drifter. Mounts one or two drills.

THOR SINKERS AND LEGS—Easy one-man operation for drifting and tunnelling, PLUS complete Thor dependability. Six drill models, three legs. Steel or aluminum cylinders.

THOR POWER FEED DRIFTERS—Variable speed air motors aid penetration, reduce bit breakage. Two drill models, six mountings, steel or aluminum up to 48"+48" feed.

THOR POWER TOOL COMPANY

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INDEPENDENT PNEUMATIC TOOL CO. LTD.
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Anvers, Belgique

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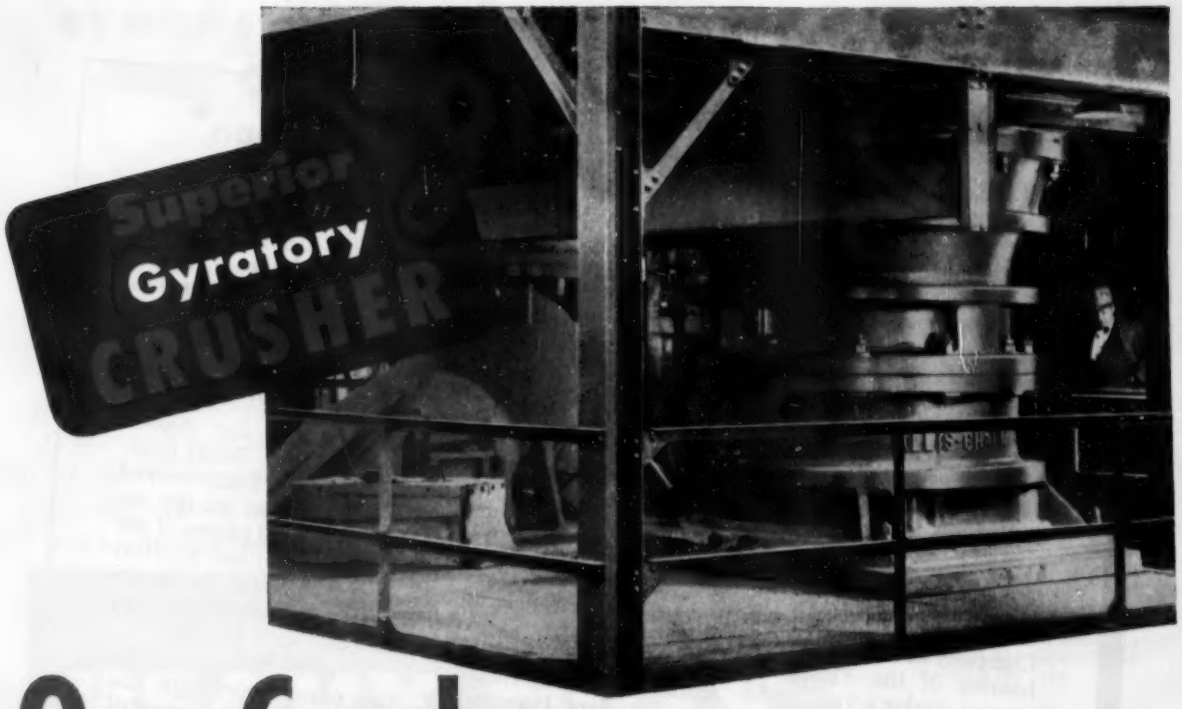
R. H. Dungey, Resident Engineer
P. O. Box 483, Benoni, Transvaal

CENTRAL AMERICA
Herramientas Thor de México S. A. de C. V.
Basilio Badillo No. 47
México D. F., México

BRASIL
Thor Tool Hemisphere, Inc.
Visconde de Parnahiba 1199, São Paulo

CANADA: Thor Power Tool Company, 1909 Davenport Road, Toronto, Ontario



One Crusher... Does Work of Two!

HOMESTAKE MINING Company installed a modern 30-55 *Superior* gyratory crusher to replace two old *Gates* gyratories. Despite the fact that the new crusher has a 30-inch feed opening, instead of a 17-inch opening as on the old crushers, it fits snugly into half the former space for two. The *Superior* can turn out much more tonnage than both old crushers. And it's built to surpass the 38-year service record of the old crushers.*

This increased capacity and improved performance is a direct result of over 70 years of experience in building crushers, years in which Allis-Chalmers leadership introduced many design advantages in gyratory crushers — the short mainshaft . . . improvements in the shape and size of the crushing chamber, in weight distribution, in dust protection and lubrication. These and other features mean more *profitable* crushing for you, when you specify Allis-Chalmers!

A-4195

For more facts on *Superior* primary or secondary crushers, call the Allis-Chalmers representative in your area or write Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 07B7870.

**Yes, the old Gates crushers were built by Allis-Chalmers too — back in 1913!*

Superior and Gates are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

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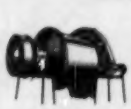
Vibrating Screens

Jaw Crushers

Gyratory Crushers


Grinding Mills

Kilns, Coolers, Dryers

How Dorrco Worldwide engineering serves the mining industry throughout the world . . .

Roasting Copper-Zinc Concentrates in Japan*

PROBLEM: To provide a satisfactory means of roasting 83 metric tons per day of complex copper-zinc concentrates to permit selective electrowinning of copper and zinc from the same solution. The client had been producing copper for many years but had previously been unable to recover zinc.

HOW THE JOB WAS HANDLED: The client made initial contact with The Dorr Company in Stamford after hearing of the FluoSolids process during a visit to the United States. Arrangements were made to ship a sample of the ore to The Dorr Company's Westport Laboratories for preliminary testing to determine the feasibility of the project.

Testing was carried out both in Japan by the client and at Westport by The Dorr Company on roasting the ore by the FluoSolids process and on leaching the resulting calcine to determine solubilities. During the major portion of the tests, one of the client's engineers visited at Westport so that he would be completely familiar with results.

The combined test procedures proved the practicability of the FluoSolids process on this operation and a proposal was submitted for a complete FluoSolids System. It proved to be most advantageous to the customer to furnish design and engineering from Dorr in Stamford, and to manufacture the Reactor and a number of components locally in Japan. Materials and auxiliary equipment not immediately available locally were furnished from the U. S. by Dorr. A Dorr engineer was sent to Japan to familiarize operating personnel with equipment and assist with initial operation.

Meantime, our Associates in Japan, Sanki Engineering Co., Ltd., worked with the client on the design of several phases of the leaching plant and supplied the majority of the leaching equipment which was manufactured locally.

Now in full operation, the plant represents the world's first successful roasting of copper and zinc with electro winning of both metals.

FluoSolids is a trademark of The Dorr Company, Reg. U. S. Pat. Off.

This is but one example of how the flexibility of the Dorrco Worldwide engineering organization has worked to the advantage of a client. It can work for you too, through any of the following Associated Companies and Representatives, all with facilities for local manufacture.

In Europe: Dorr-Oliver Companies in England, Belgium, The Netherlands, France, Germany and Italy.

In South Africa: E. L. Bateman Limited, Johannesburg.

In India: Dorr-Oliver (India) Limited, Bombay.

In Australia: Hobart Duff Pty. Ltd., Melbourne.

In Japan: Sanki Engineering Co., Ltd., Tokyo.

In South America: Flore Company in Buenos Aires; Serva Ribeiro in Rio de Janeiro and Sao Paulo; John Lindsay in Caracas; and conveniently located Dorr Resident Engineers.

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Better tools TODAY to meet tomorrow's demand

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SYMONS VIBRATING BAR GRIZZLIES

. . . up to 500 tons per hour handling feeds ranging to power shovel size

The SYMONS Type-K vibrating manganese Bar Grizzly is recommended for large tonnage *Scalping* of ore, rock or gravel. The powerful vibrating action of the Bar Grizzly makes it particularly effective for wet, sticky or gummy materials. The sloping, curved bars of the Symons Bar Grizzly tend to cascade the material as it passes over the screening surface. The tumbling action effectively assists in separating the undersize. Will handle feed sizes up to 30″ and larger.

For full details about the SYMONS BAR GRIZZLY, send for BULLETIN 121A.

FOR HEAVY DUTY SCALPING SERVICE

For full details about the SYMONS ROD GRIZZLY, send for BULLETIN 207.

SYMONS VIBRATING ROD GRIZZLIES

. . . up to 500 tons per hour for feeds up to 10″ — 12″

The SYMONS Type-K—RG vibrating Rod Grizzly is built for heavy duty scalping service in large tonnage operations . . . bridging the gap between primary breaking and the secondary crushing and screening operations. It can readily handle dry, wet, sticky or gummy ores and rock. Some of the important features include:

Abrasion resistant heavy spring steel rod screening surface; Long lasting, low cost rods are easily adjusted or replaced; Effective, vigorous vibration provides thorough scalping; Amplitude of vibration can be quickly and easily changed to meet various operating conditions. Ideally suited for service following most sizes of primary crushers and scalping operations requiring relatively coarse separations in the range between 1″ to 4″.

5253

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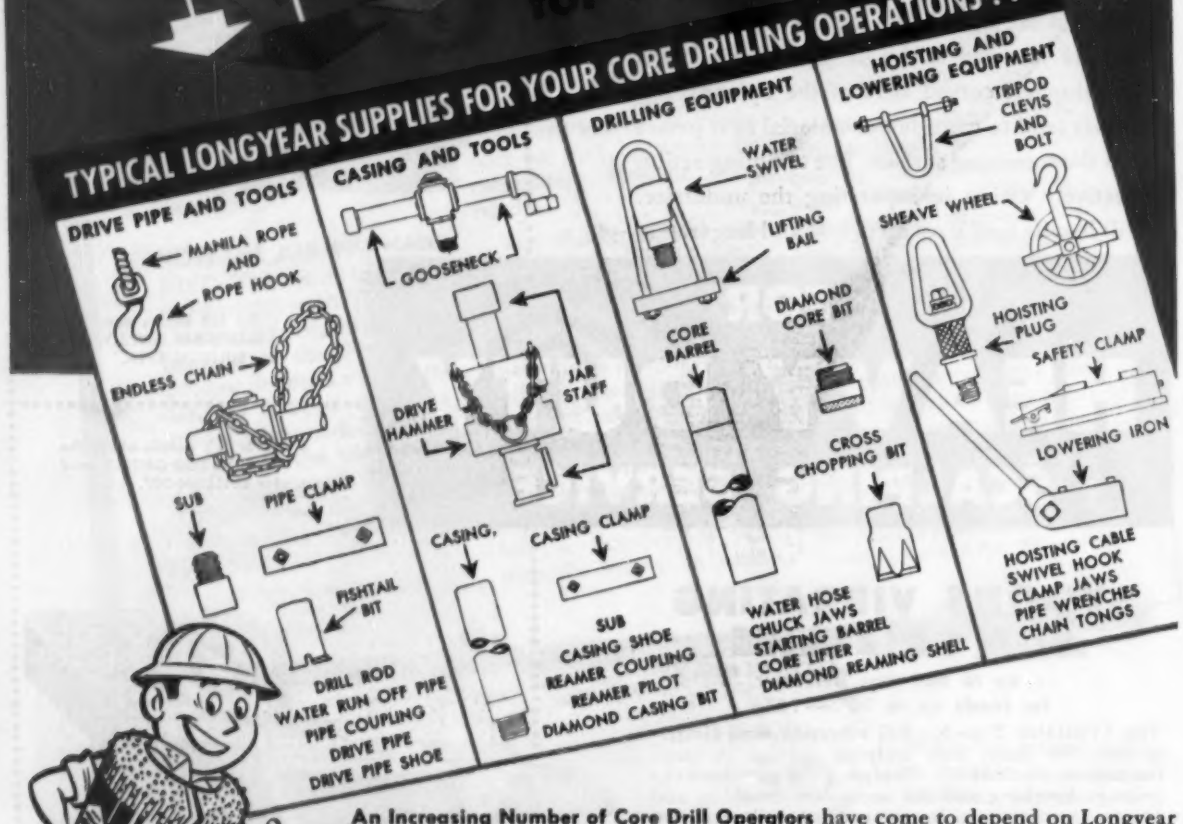
TYPICAL LONGYEAR SUPPLIES FOR YOUR CORE DRILLING OPERATIONS . . .



. . . Cores Tell The Story

An Increasing Number of Core Drill Operators have come to depend on Longyear for core drilling supplies. Longyear's exacting manufacturing standards and close inspections of finished products assure dependable operation at lower costs, and elimination of much lost time.

It is easy to obtain Longyear Quality in core drilling parts and supplies as a wide range of such equipment is always available.

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DIAMOND CORE DRILLS • CONTRACT CORE DRILLING
SHAFT SINKING • GEOLOGICAL INVESTIGATIONS

—Drifts and Crosscuts—

Industries Experiences Joined—The September 1947 Iron Range Edition of MINING WORLD outlined the interdependence and cooperation of the iron mining industry of the Lake Superior District and the nonferrous segment of the industry as follows: "Iron mining, with certain of its techniques and problems peculiar to that branch of the industry, has long since invaded the nonferrous field in the application of its methods to the open pit mines of the western states. But it has only been in recent years that the iron mining industry has begun to benefit from the techniques and equipment developed for non-ferrous mining in the handling and processing of low-grade ores."

Since 1947 this statement has been proven time and time again. The recent important announcement by the Erie Mining Company that it had employed the engineering department of the Anaconda Copper Mining Company to do the engineering, prepare plans and specifications, and be responsible for construction of Erie's new taconite plant most strongly confirms the interdependence of these two great segments of the industry.

Anaconda's engineers, headed by Wilbur Jurden, bring a wealth of know-how to the Iron Range. They know that big tonnage concentration must start with big thinking and big planning. They have the result of successful plants behind them: Andes Copper Mining Company's plant in 1925; the Cananea low-grade ore project of the Green Cananea Copper Company in 1944; the Chuquicamata sulphide plant of the Chile Exploration Company in 1952; and the Yerington project of the Anaconda Copper Mining Company in 1953. Andes, Cananea, and Chile Exploration are Anaconda subsidiaries.

Mr. Jurden was also chief consulting engineer for the Morenci Branch of the Phelps Dodge Corporation during design and construction of the flotation mill, smelter, and auxiliary facilities in 1939.

Both Erie and Anaconda can and will profit from their association. MINING WORLD congratulates the officers of both companies for this outstanding example of cooperation. The nation and the metallurgical engineering profession will be the benefactors.

Domestic Developments—Anaconda Copper Mining Company has placed two new important plants in production in the last 90 days . . . The first was the new carbonate leach uranium plant in Bluewater, New Mexico . . . The second is the Yerington, Nevada copper oxide leaching plant . . . Anaconda is justifably proud of these plants, both from an engineering and metallurgical point, and the fact that the two vital defense plants were built with the company's own money . . . No government money was used to finance either plant . . . Anaconda has been an aggressive newcomer to the uranium business . . . In characteristic tradition, extensive geological study and air-borne radiometric surveys have increased uranium reserves in New Mexico's Grants district whose ores the new mill is treating . . . Anaconda's mining of one deposit presents a bold departure from Colorado Plateau practices . . . Instead of underground mining of the spotty, irregular and unpredictable ore bodies, an open pit is being developed at the Jackpile mine . . . With Anaconda's long experience in mining and leaching oxide copper ores at Chuquicamata, Chile and Inspiration, Arizona as a starting point, the new Yerington plant is the most modern in the world. . . . Prospectors have found some narrow but interesting fluorite deposits in southwestern Mineral County, Nevada just east of the California border . . . Samples have been high grade which is an important factor because the prospects are more than 40 miles from the nearest railroad.

Exploration Tools—The new Varian Induced Nuclear Resonance Meter has been termed the world's most accurate magnetometer . . . It should prove valuable in locating anomalies which might indicate ore deposits . . . The instrument electronically measures the wobble of hydrogen particles to indicate the earth's magnetic field at a definite geographic location . . . A new type of truck-mounted magnetometer has successfully speeded iron ore exploration in Nevada . . . It has been developed by the United Geophysical Company after two years of testing . . . Continuous tape recording of anomalies covering 200 miles of traverses per day have been made . . . The machine is the only one in the world of its type and is now being used in Arizona.

Activity Abroad—Spectacular gold developments in Australia made 1953 the best year since the boom of the mid-1930's . . . In the Mount Magnet district of Western Australia, rich ore was found at depth, particularly in the Hill 50 mine . . . Other mines in Western Australia making record profits were Central Norseman Gold Corporation, N. L.; Great Boulder Proprietary Gold Mines, Ltd.; and New Coolgardie Gold Mines No Liability . . . Higher grade ore and greater tonnage treated were the main reasons for higher profits . . . Tin smelting experiments are still under way in Bolivia . . . The experimental unit has a one ton per day capacity . . . A larger pilot plant is the next step . . . Super charged air or enriched oxygen air appear necessary because of the 14,000 foot altitude.

Colorado Convention—Watch for a full report in the March issue on the year's outstanding convention—that of the Colorado Mining Association. Hon. Felix E. Wormser, Assistant Secretary of the Interior, is scheduled to release the new minerals policy of the federal government prepared under the orders of President Eisenhower . . . Of great importance to the mining industry will be the special report by U. S. Bureau of Mines' director John J. Forbes on "Mining's Future in the Western States".

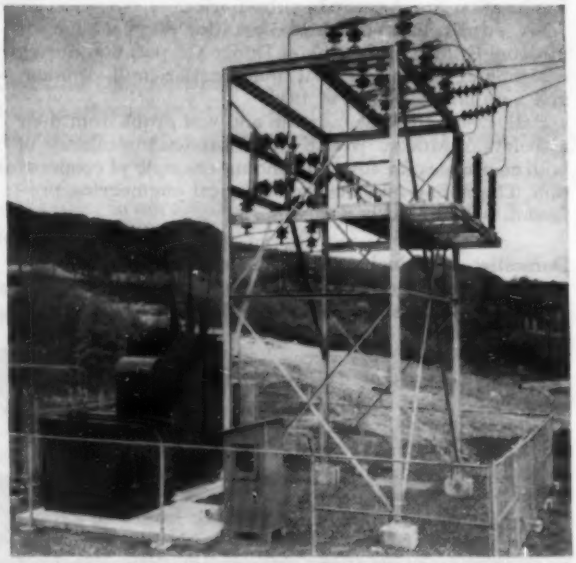
ENGINEERING REPORTS:

Photograph courtesy of Kennecott Copper Corporation

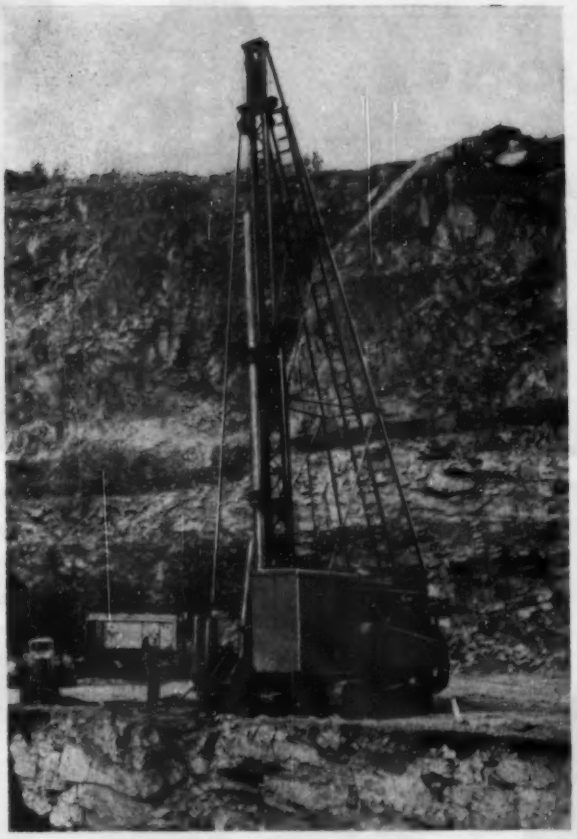
1 STEP UP SHOVEL SPEED, CAPACITY. This shovel performs faster, more smoothly, thanks to its simple, rugged G-E drive system. Usable torque is increased. Response and acceleration are improved. Amplidynes, which control shovel motions precisely, prevent excessive current and torque peaks which might damage electrical and mechanical equipment.

5 ways modern electrification can

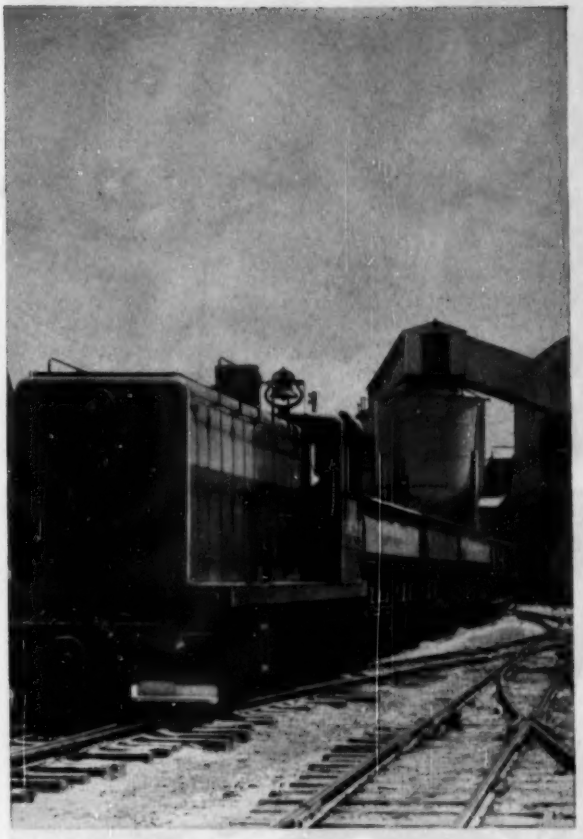
4 MAKE POWER SYSTEM MORE FLEXIBLE. This standard G-E cable-skid switch house has polarized couplers to simplify and speed up cable interchanging. Skid house is easy to move.



5 IMPROVE POWER SYSTEM PROTECTION. Magne-blast breakers in G-E master unit substation protect feeders; lightning arresters help guard substation against outage.



2 **INCREASE DRILL FOOTAGE.** This self-contained churn drill, powered by G.E., delivers rapid rock penetration—promoting more efficient drilling and blasting practices.



3 **HAUL MORE ORE.** General Electric 70-ton diesel-electric locomotive has high availability. It maneuvers rapidly, efficiently, helps speed all switching operations.

help you mine more tons per day

G-E engineered electrical systems mean faster open pit mining at less cost

You need speed, flexibility, and safety in your open pit mining operations if you are to meet present demands for higher production per man-day. *Modern electric power* is the key. Here's what it helps you to do.

1. You can speed up the digging cycle. G-E amplidyne-controlled drives provide faster hoist, swing, and crowd action on power shovels. Shovels work around the clock with minimum time lost for maintenance or repairs.

2. You can step up drilling efficiency. Modern rotary and churn drills, powered by General Electric, are self-propelled. Smooth, fast motor control helps them to drill harder rock at higher speeds.

3. You can haul greater tonnages. G-E diesel-electric locomotives withstand hard work cycles. Units can be operated close to the wheels' slipping point even with heaviest loads.

4. You can cut re-location time. G-E cable-skid switch houses give a more flexible power system arrangement. Moving is simplified. Cable connecting time is minimized.

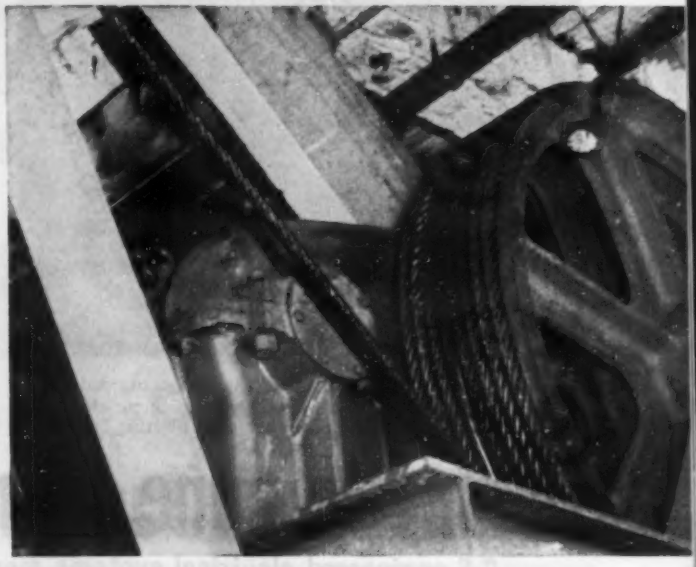
5. You can increase mining efficiency and safety with portable G-E unit substations. They improve voltage levels—make full equipment capacity available. Distribution losses are reduced. Grounding systems help protect personnel and equipment.

These production-boosting techniques can be applied to your surface mining operation: A G-E mining industry specialist can show you how. Contact him at your nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, New York.

660-39

Engineered Electrical Systems for the Mining Industry

GENERAL ELECTRIC



EXTRA FLEXIBILITY—Wire rope encounters fast sheave action, reverse bending, constant stop-and-start operation on many jobs. When this same rope must also lift or pull heavy loads, an unusually flexible, strong wire rope is needed.

Rope jobs like paver skip hoists, overhead cranes, large shovel and dragline hoists, and sawmill carriages demand these qualities. That's where the use of 6 x 37 Red-Strand wire rope saves time and money.

Where will 6x37 Red-Strand improve your wire rope service?

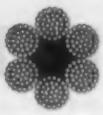
Look at a cross section of 6 x 37 wire rope. You see three rings of small, uniformly sized wires in each strand. This differs from a rope construction like 6 x 19, which contains fewer and larger wires.

The ***smaller size*** wires make 6 x 37 more ***flexible***. The ***larger number*** of wires maintains rope ***strength***.

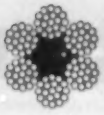
Would this combination improve your wire rope service? Would it solve a problem for you? Leschen's higher-than-rated quality is also providing longer-than-expected service to heavy industry everywhere.

Check with your Leschen man. He can help you.

Leschen's 64-page Wire Rope Handbook tells you all about 6 x 37 and other Red-Strand wire rope constructions. Ask or send for your free copy.



6 x 37



6 x 19

LESCHEN WIRE ROPE DIVISION
The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)
St. Louis 12, Missouri

LESCHEN
HERCULES Red-Strand
WIRE ROPE

CAPITOL CONCENTRATES

TWO NEW METAL PAYMENT PLANS: AMERICAN METAL HAS THE "UNECONOMIC MINE PLAN"; OTHER IS A "REVERSE SUBSIDY"

The American Metal Company, Ltd., a strong opponent of increased tariffs, recently suggested a new subsidy device which merits consideration by industry. In submitting the plan, the company made the following comments:

(a) A study should be made to determine the approximate economic prices for lead and zinc. Such determination should be reviewed periodically. Each metal should be treated separately. Uneconomic mines should not be subsidized. We use the word "uneconomic" to mean mines whose costs do not permit them to compete successfully against available substitute materials.

(b) In the event the price of the metals falls below the determined economic price, a subsidy would be paid to all producing mines pro rata to the decline in price. This subsidy should not be more than one-half cent per pound for each one cent per pound that the price declines below the determined economic price.

(c) During the periods when the subsidy is payable, a portion of the metals subsidized must be purchased by the United States government for permanent stockpiling. This is a most important proviso which is essential, otherwise the subsidy plan would penalize efficient producers. Stockpiling should start after the price declines by, say, 1.0 cent below the determined economic price and the tonnages stockpiled would increase as the market price decreases. There should, however, be an upper limit on the tonnage to be purchased by the United States government for stockpiling during any one year.

(d) The uneconomic mines could be kept on a stand-by basis, if necessary by government assistance, so that these future assets would be available when needed for emergency reasons, or when they became economic through changes in prices or technological advances.

The American Metal Company comments on this new plan as follows: "The plan is impartial, simple, would require a minimum of administrative expense, the cost of it would be easily measurable, and it recognizes that certain lead and zinc mines are uneconomic. If the determined economic prices are reasonable, there should be no premium on inefficiency and this plan of subsidies would not have the discouraging effect on the consumption of lead and zinc which high tariffs would bring about. Furthermore, the tonnages which might be stockpiled under the plan would be purchased by the United States government at low lead and zinc prices."

It is hoped that American Metal's new subsidy idea will evoke widespread comment so that it can be evaluated before the Congress gets into high gear.

"Reverse Mine Subsidy"

Dr. Mauricio Hochschild, in a long letter to the *American Metal Market*, points out that total production costs abroad, at least in South America, are frequently higher than in the United States due to a number of factors in which direct labor costs play only a part. He also suggests that increased tariffs would be no real solution to the problem of over-production.

Hochschild's panacea is voluntary restriction of production by the larger mines until a satisfactory market price is reached, which he seems to think would be around 12 cents per pound for zinc. This would mean the loss of large marginal ore bodies in the United States. Many of our marginal mines with considerable reserves need 17 cents and even 19 cents in order to operate profitably.

Hochschild is not alone in thinking that restriction of production during periods of surplus may be the answer to the zinc-lead problem, and that of other minerals which may from time to time be similarly situated. Recently, one of our well-known mining executives proposed what, for mining, is a completely novel scheme—payments by the government for not producing.

In its elementary form, the plan amounts to this:

1. The preliminary term of the plan would be two years;

2. Participation would be voluntary;

3. The "normal" production of the mine would be determined. The incentive for reducing production would be a payment of, say, 2 cents per pound for zinc and 5 cents per pound for lead not produced. If a mine closed down completely it would receive this payment on the entire normal production. If it elected to operate at 50 percent of capacity, it would receive the regular smelter return on half and the "incentive-to-curtail" payment on half of its predetermined "normal production";

4. The government would have the option of purchasing metal produced by members of the plan at current market prices;

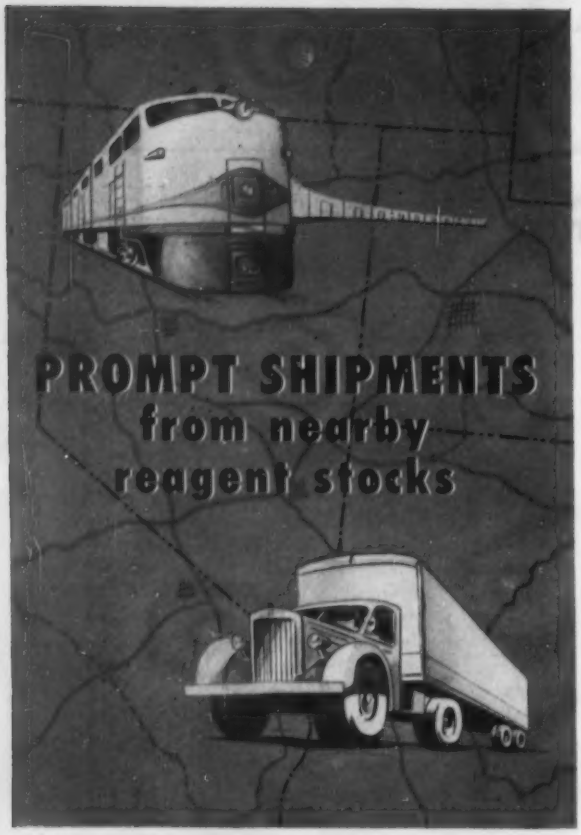
5. Mines participating in the plan, whether in partial operation or totally shut down, are obligated to maintain the mine in such condition that at least "normal" production could be resumed readily.

The direct cost of such a reverse subsidy plan would be immensely less than an incentive payment plan where the additional production is purchased for the stockpile. It would have the same advantage or disadvantage of artificially increasing prices to the consumer as have the quota and tariff proposals.

New thinking in the mining industry is essential—and this proposal is certainly something new to think about!

• *Geophysical Claim Act May Be Reintroduced*

In 1946 the Mining and Minerals Subcommittee of the Senate Small Business Committee completed nearly two years of work in drafting a bill called "The Geological and Geophysical Mining Claims Act of 1947." This bill (S. 1793) was introduced into the 80th and 81st Congresses by Senator James E. Murray of Montana. Senate Subcommittee Print No. 18, 79th Congress, 2nd Session, issued by the Senate Small Business Committee, tells the story and prints the text of the bill. The subcommittee had thought that large segments of the mining industry were ready for such legislation, which permitted the location of large areas of the public domain for scientific prospecting. However, little or no support devel-



Western mills benefit doubly by Cyanamid Service on their complete reagent requirements.

We offer a comprehensive stock of flotation reagents and other metallurgical chemicals for both metallics and non-metallics . . . with added economy in both transportation costs and balanced inventories through combination shipments from nearby stocks.

Cyanide and Flotation Reagents in active demand are available from strategically-located stock points. Orders may be placed with our New York office or with American Cyanamid Company, 1440 Broadway, Oakland 12, California; El Paso, Texas; c/o Weicker Transfer & Storage Co., Denver, Colorado; or c/o Goodwin & Mayflower Moving & Storage Co., Spokane, Washington.

We invite inquiries for a detailed stock list of Cyanamid Metallurgical Chemicals available at the stock-point nearest to your mill.

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oped for the bill, hearings were never held, and the sponsor did not reintroduce it.

Renewed interest was shown this year when the Brookings Institution in its brief written for the Mid-Century Conference on Resources for the Future published the text of the bill with the comment that "the proposed act went through many revisions, and in its final form had the support of many mining geologists, both in industry and in government, but was never enacted into law."

Sometimes it is as bad to be too soon as too late. It is very likely that this bill will be reintroduced in the present Congress and it is to be hoped that industry will demand hearings.

• *Sand And Gravel Are Not Minerals*

Alaska has cut the Gordian knot which the Regan Bill if passed, is expected to untie. The Regan bill, it will be remembered, is intended to remove from acquisition under the mining laws and provide for disposition under the Materials Disposal Act of 1947, common stone, sand, gravel and cinders. The designation of these materials as minerals under the mining laws is said to have led to many of the abuses of the rights of location which have caused such a public furor. In brief, the Alaskan courts have ruled that sand and gravel are not minerals and cannot be "discovered" in the traditional mining sense. The decision is still subject to reversal on appeal.

• *SBA Plans Cooperation, Not Competition*

The new Small Business Administration has been at work long enough so that its philosophy of operation is becoming a little less obscure. In a recent press release Acting Administrator Wendell B. Barnes stated that the organization "is motivated by a philosophy of full cooperation, rather than competition, with private financing institutions." Its principal plan of operation, judging from the release, "is for SBA to purchase participations, either deferred or immediate, in loans made by banks to qualified small businesses." This obviously takes a lot of the risk out of banking as the participations may be up to 90 percent. At the same time the bank, no doubt, draws good interest on these guaranteed loans. SBA has made a few small direct loans in cases where the bankers evidently would not take even a small risk. A curious activity of SBA appears in the issuance of a leaflet called "Fire Prevention in Small Business." The further activities of SBA will be watched with interest—especially the granting of its first mining loan, something still in the future.

COMING CONVENTIONS

February 15 through 18, 1954. Annual Meeting AMERICAN INSTITUTE OF MINING ENGINEERS, mining branch at Statler Hotel and metals branch at Hotel McAlpin, New York, New York.

(Special Note: **Montana School of Mines** Alumni will meet in Parlor A, Statler Hotel, Tuesday February 16 at 6:30 for cocktails and dinner. **Michigan College of Mining and Technology** alumni will meet at same day and time in Statler Hotel's Penn Top North.)

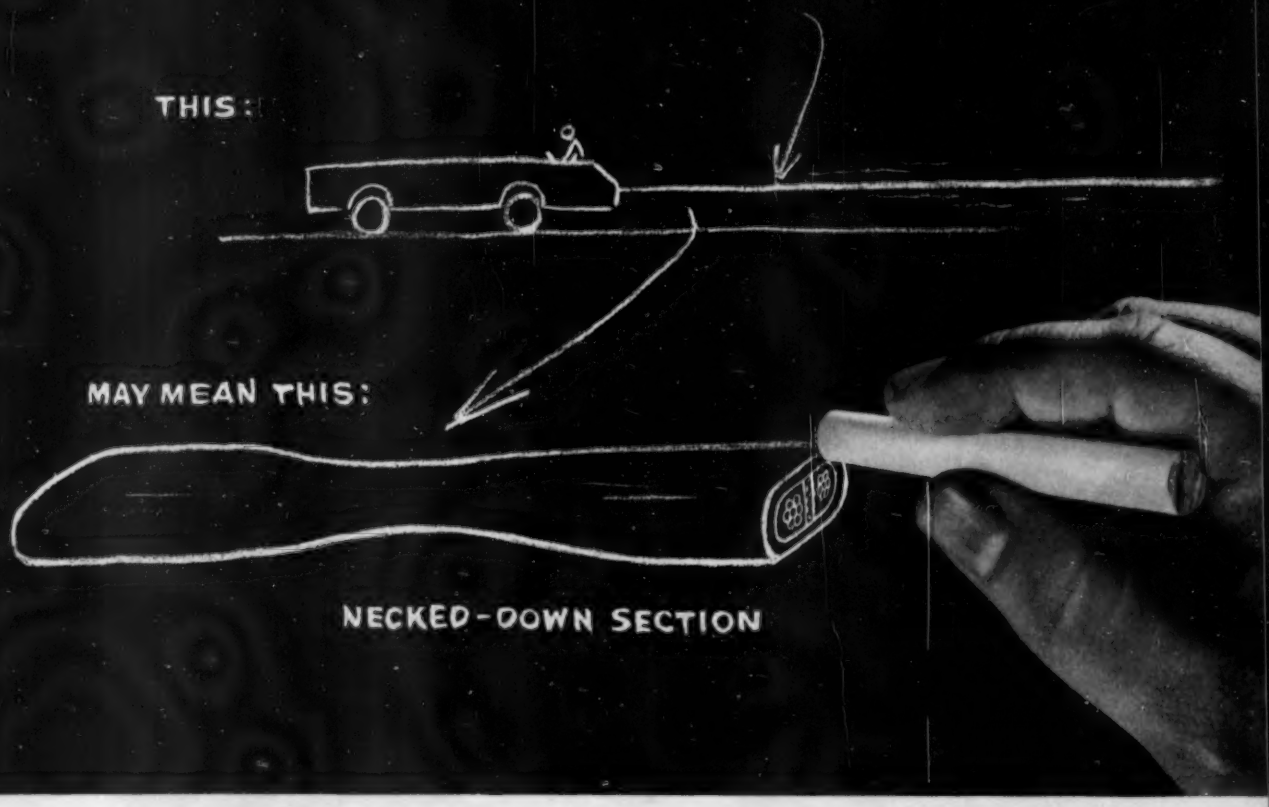
April 28 through 30, 1954. Joint Meeting AMERICAN ZINC INSTITUTE and LEAD INDUSTRIES ASSOCIATION, Drake Hotel, Chicago, Illinois.

April 29, 30 and May 1, 1954. PACIFIC NORTHWEST METALS AND MINERAL CONFERENCE, Multnomah Hotel, Portland, Oregon.

May 24 through 27, 1954. The first SYMPOSIUM ON INSTRUMENTATION for makers and users of instruments for industrial hygiene. University of Michigan Institute of Industrial Health, Ann Arbor, Michigan.

MINING MACHINE CABLE

HOW TO SPOT DAMAGE FROM TOO MUCH TENSION



. . . AND WHY ANACONDA'S NEW BALANCED DESIGN ADDS SAFETY, LONGER LIFE TO CABLE

Necked-down cable shows overstretching. Jacket and insulation become thin, easily punctured. Moisture penetration or a broken ground conductor may make the cable hazardous.

ANACONDA'S ANSWER: BALANCED DESIGN

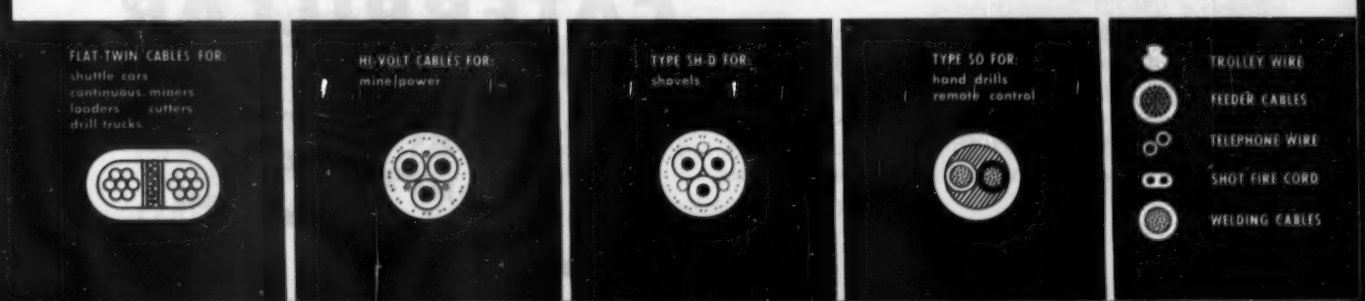
Tension devices help; but aren't cure-alls. An added safeguard lies in the balanced design of Anaconda's new mining-machine cable. Stretchability of the ground has been increased. It will not break before the power conductors. A new neoprene jacket has higher compression-cutting resistance and tensile strength. In the insulation more strength and moisture resistance are obtained from a cold-rubber base . . . similar to that used by tire makers to mold a tougher tire. Stranding, too, has been redesigned to make the whole cable more flexible . . . at no greater cost. You get less trouble from tearing, cutting, gouging and abrasion caused by rib-pinching, runovers and dragging.

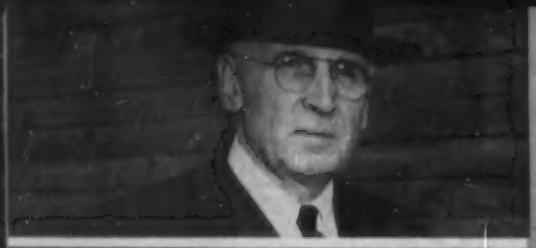
MUCH LONGER AVERAGE LIFE

In shuttle cars recently surveyed in 15 mines, ANACONDA Cables last 3 times as long as cables made only a few years ago. To learn why this is so, ask your nearest Anaconda Sales Office or Distributor for a sample section of this new cable. Examine it . . . take it apart. And remember that no ANACONDA Mine Cable has ever failed a U. S. Bureau of Mines flame test. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

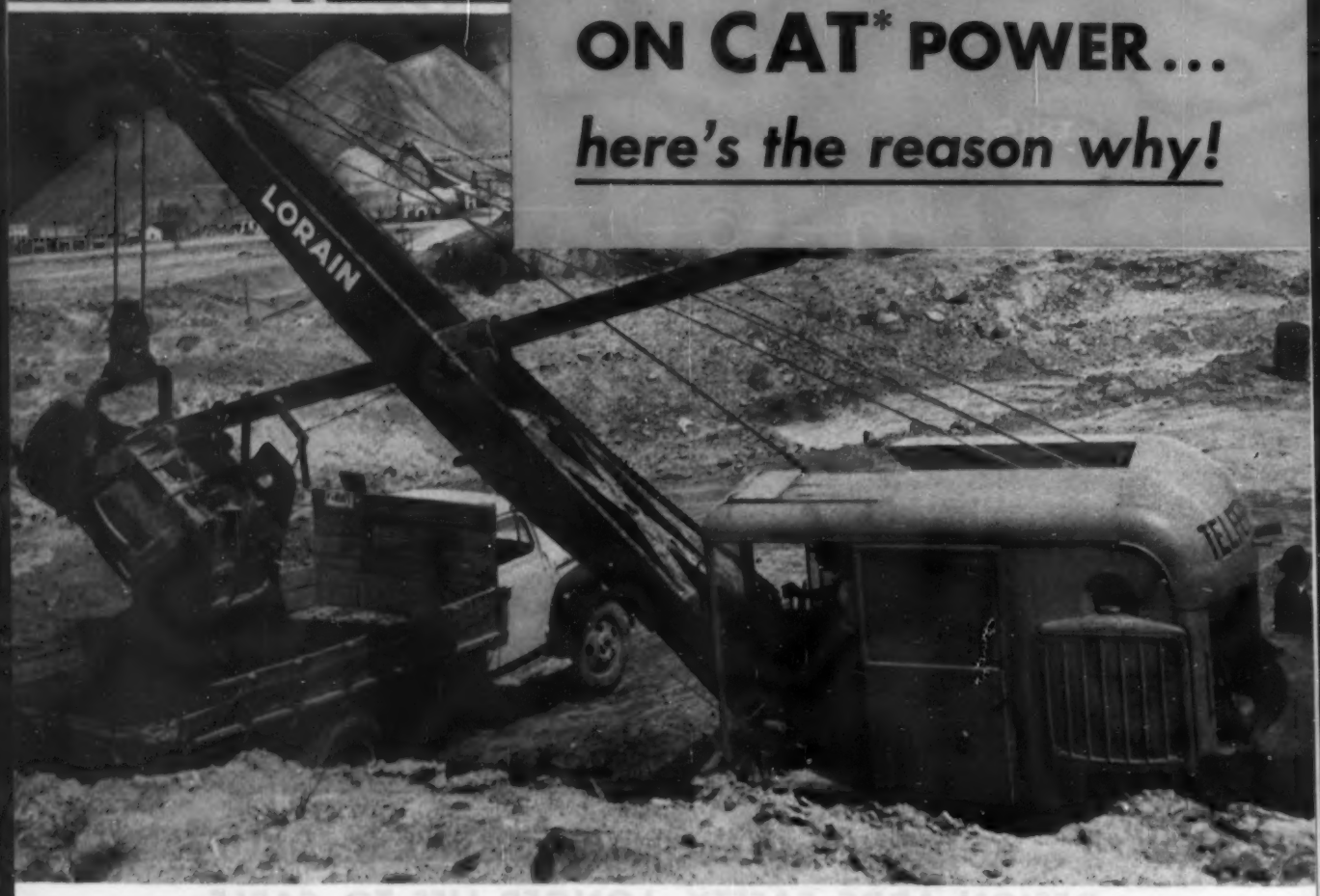
ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE





Mr. Telfer plans to STANDARDIZE ON CAT* POWER... *here's the reason why!*



Through heavy dust and the extreme swing of Canadian seasons, the Caterpillar D318 Engine in this one-yard Lorain shovel delivers steady production for the Telfer Construction Co., Ltd., Montreal. Here you see it stripping overburden in an asbestos mine at Black Lake, Quebec.

The unit loads a four-yard truck every 65 seconds, 10 hours a day, five days a week. It works all year round. Based on 4100 hours' experience with this economical, fast-working engine, Mr. S. Telfer, president of the firm, says: "We're planning to standardize on Caterpillar equipment. Our dealer gives us good service, and we have no complaints."

Like Mr. Telfer, many veteran mining men find that it pays to standardize on long-wearing Caterpillar Engines. Thanks to their exclusive fuel injection system, all Cat Engines can deliver full and foul-free power on low-price No. 2 furnace oil. This cuts costs four ways: cheaper fuel, less of it, reduced maintenance and less down time. Standardization pays off, too, in increased operator familiarity and ease of maintenance. And also in one dependable source for fast service and genuine parts—your nearby Caterpillar Dealer.

There are 12 Caterpillar Engines and Electric Sets, to 500 HP and 315 KW. Your Caterpillar Dealer will help you select the power unit that fits your needs. Be sure to see him before you repower. And specify Caterpillar power when you order new equipment—more than 150 manufacturers can supply it in their machines!

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A WORD TO THE WISE— STANDARDIZE!

Mining World

THE IMPORTANT MINING MAGAZINE EVERYWHERE

February, 1954

INTERNATIONAL PANORAMA

NOGALES, ARIZONA—The Duval Sulphur and Potash Company has started a surface diamond drilling exploration program at the Red Mountain copper-molybdenum deposit 12 miles northeast of here.

MOAB, UTAH—The United States Atomic Energy Commission will build a uranium sampling and ore buying plant here with the ore scheduled for processing in the planned Utex Mining Corporation's mill. The sampling plant will be in operation before the end of 1954.

HENDERSON, NEVADA—Manganese, Inc. has placed its rebuilt manganese flotation plant in operation here. The $1,000,000 fire-proof plant incorporates new equipment to improve metallurgy and recovery over the old plant which burned in July 1953.

JOHANNESBURG, UNION OF SOUTH AFRICA—The 23rd South African gold mine has signed a contract to produce uranium. It is the Dominion Reefs (Klerksdorp), Ltd. which failed as a gold mine and will now become a uranium mine with gold as a byproduct.

WASHINGTON, D. C.—The Office of Defense Mobilization has set the nickel production goal at 190,000 annual tons. Expansion of Nicaro and Freeport Sulphur Company facilities in Cuba to add 38,000 tons are under consideration.

MULLAN, IDAHO—Hecla Mining Company has plans for deep exploration of the Deadman's Gulch shear zone north of the Osburn fault.

GRANBY, BRITISH COLUMBIA—Newmont Mining Corporation will join Granby Consolidated Mining, Smelting & Power Co., Ltd. in the delimitation development of two copper deposits owned by Granby's Granduc Mines, Ltd. Newmont may acquire a 50 per cent interest.

NKANA, NORTHERN RHODESIA—Rhokana Corporation Ltd. is making metallurgical tests on its uranium bearing copper ore from the Mindola section. Development of the section is being continued.

PANAMA CITY, FLORIDA—Large deposits of beach sands containing illmenite and rutile have been discovered along the Gulf of Mexico. About seven per cent of the sand is titanium minerals.

BELGRADE, YUGOSLAVIA—Large deposits of lead-zinc ore have been discovered by deep exploration at the 2,000 year old Srebrenica mine.

PITTSBURGH, PENNSYLVANIA—The largest production of steel during any year, in history, in any one country was the 1953 record of American iron and steel companies in producing more than 112,000,000 tons of steel.

KUALA LUMPUR, MALAYA—Petaling Tin, Ltd. has purchased 600 acres of tin-bearing land which the company prospected in 1938. Ten years of dredging ground are available for the No. 6 dredge. Dredging operations are not scheduled to start until after 1962.

LISBON, PORTUGAL—Beralt Tin & Wolfram, Ltd. has developed substantial reserves of tin and tungsten ore in the Vale da Ermida Section of its mine. Grade is low so that large scale caving operations may be necessary.

LIMA, PERU—Republic Steel Corporation has signed an exploration contract with Pan American Commodities S. A. covering 26,000 hectares of potential iron bearing land in southern Peru.

PERTH, AUSTRALIA—What may be an important uranium deposit has been discovered about 35 miles east of here. Norseman Gold Mines N. L. and Uranium Mines N. L. have staked claims covering 50 acres.

EAGLE MOUNTAIN, CALIFORNIA—Iron ore production by Kaiser Steel Corporation reached an all time annual high in 1953 when 1,759,437 tons were mined.

MOAB, UTAH—Charles A. Steen has sold the Big Buck uranium mine and claims to Joseph W. Frazer and associates for about $2,000,000. The mine adjoins Steen's famous Mi Vida mine.

Climax Moly Puts New No. 4 Mill In Operation

The Climax Molybdenum Company has completed and placed in operation its new No. 4 mill at Climax, Colorado. This 5,000-ton-per-day unit finishes the second stage of Climax's post-Korean War expansion and brings total mining and milling capacity to 27,000 tons per day. The new mill is built as a westward extension of the No. 3 mill placed in operation early in 1953 and is almost a duplicate. Climax expansion is to fulfill its contract for low-grade molybdenum ore mining and processing with the DMPA. Under the contract, ore that would have been too costly and difficult for the company to mine and which would be lost in normal mining operations can now be mined and molybdenum delivered to the stockpile.

The new No. 4 unit has three 9-by 9-foot March grate-type ball mills in closed circuit with 72-inch Duplex Akins Spiral classifiers for grinding, and, Climax-Weinig and Fagergren flotation cells producing a rougher concentrate. Grinding and cleaning of rougher concentrate are being done in existing mill facilities. Ore from both the Phillipson and Storke levels is being treated in the new unit.

Republic Will Explore Peruvian Iron Deposits

An exploratory option for the purchase of about 65,000 acres of land in the foothills of the Andes Mountains south of Lima, Peru has been signed by Republic Steel Corporation of Cleveland, Ohio with Pan American Commodities, S. A. of Lima. The agreement will enable Republic to undertake exploratory diamond drilling and necessary tunnel work to determine whether iron ore deposits exist in sufficient quantities for commercial development. Disposition of the ore, if it is found, has not yet been decided.

Pan American Commodities completed superficial geographical studies of the land, as well as cartographic studies. Indications are that the iron is of high quality, possibly 66 to 68 percent iron.

Newmont To Share In B.C. Copper Project

Engineers of Newmont Mining Corporation will cooperate with Granby Consolidated Mining, Smelting & Power Company, Ltd. in development of property held by Granduc Mines Ltd. in British Columbia. Granduc is controlled by Granby. A recent agreement between the two firms gives Newmont the right to acquire 50 percent of Granby's interest in these mines where two prospective copper ore bodies were discovered last fall. (See MINING WORLD, November 1953, page 71.) Diamond drilling and tunneling are expected to be resumed in the early spring.

Aerial view of the monazite dredging operations in the Cascade Valley of Idaho. Boat (shown by arrow) at lower left is that of Baumhoff-Marshall. In the center is Idaho-Canadian Dredging Company's boat, and at top right is the salvaged sections of Warren Dredging Corporation's boat. Top of the picture is south.

New Dredging Techniques Recover Idaho Monazite

By George O. Argall, Jr.
Editor

Golden colored grains and crystals of monazite are the placer gold of Idaho today. Monazite [(Ce, La, Y, Th) (PO_4)] is being recovered for the first time commercially in the United States by jig-equipped, converted, connected bucket line gold dredges on Big Creek in the Cascade Valley of Valley County, Idaho, 60 miles north of Boise.

In recovering monazite, the science of dredging has added another to its list of achievements—that of recovering tons of relatively low specific gravity material from the granitic placer sands. Gold, having a specific gravity of 19.3, has long been dredged successfully in concentrations of less than 1/200 of an ounce, or less, per cubic yard of gravel. Today, on Big Creek, monazite-bearing black sands, with a specific gravity of only 4.8 and in concentrations at times as high as 12 pounds per cubic yard are being recovered from sands with a 2.6 specific gravity.

Three Dredging Companies

Baumhoff-Marshall, Inc. was the district's pioneer, starting its six-foot dredge in September 1950. It was followed in the late summer of 1951 by the Idaho-Canadian Dredging Company's six-foot boat and the Warren Dredging Corporation's four-foot boat.

Events leading to the dredging operations started in 1946 in far off India, then the world's largest producer of monazite, when the Indian government placed an embargo on exports of monazite because of its radioactivity.

By 1948, the Lindsay Light and Chemical Company, the largest rare earth and monazite processor in the United States, desperately needed monazite to stay in business and to supply rapidly growing markets and new uses. These uses include: in high grade steel, rare earth metals improve rollability; misch metal (cerium-lanthanum-yttrium) is used in jet engines, and cigarette lighter flints; compounds are used for making and polishing special optical glasses; rare earth chlorides are used for a permanent water proofing compound and as a fungicide; rare earth fluoride is used to boost brilliancy of electric arc carbons; and thorium nitrate is used for special electronic tube filaments.

Important Telephone Call

Lindsay Light and Chemical Company representatives Mark Eichleburger and Howard Kremer contacted Fred Baumhoff in Centerville, Idaho, in 1946 and told him that they needed monazite. He promised to make an investigation and report. He knew that the gold dredge operators in the Boise Basin had recognized monazite in their riffles and jigs for a number of years so sampling and testing was started. Difficulties to be overcome in dredging and redredging part of the Boise Basin directed attention to another nearby area—The Cascade Valley—where dredgeable concentrations of monazite had been discovered shortly before. This was an entirely new area; even the seventh edition of Dana's *System of Mineralogy* did not list monazite occurrences in the Cascade Valley.

The Baumhoff-Marshall Company and later the Baumhoff-Marshall Company and the Warren Dredging Company and still later the J. R.

Simplot interests secured leases on possible placer areas which were test drilled with favorable results. The dredges were moved in and Lindsay has never again been short of monazite to refine. The United States government has also bought some concentrate for the Strategic Stockpile.

Placer Monazite

Monazite and the other heavy minerals, mostly ilmenite ($FeTiO_3$), magnetite (Fe_3O_4), zircon ($ZrSiO_4$), and garnet are referred to as "blacks" or "black sands" by the dredge operators. All monazite, and 95 percent of the "blacks" will pass a 20 mesh screen.

Monazite is a widely distributed accessory mineral in the granitic rocks of the Idaho batholith. The other black minerals are found in pegmatite dikes cutting the granite. However, only locally do such minerals occur in sufficient primary quantities to permit the formation of commercial placers. In the Cascade Valley only the westward flowing streams contain monazite; limiting formation of placers to a series of irregular deposits along the eastern side of the valley. While monazite can be panned from most of the streams, test drilling has proven dredgeable ground to form only a small portion of the valley's east side with very irregular and erratic pay areas, in contrast to definite channel concentrations so common for placer gold deposits. Thus far, dredgeable ground has been found only to border the north side of Big Creek four miles southeast of Cascade.

J. Hoover Macklin, geologist for the United States Geological Survey and professor of Geology at the University of Washington, has investigated the deposits for the United States Atomic Energy Commission and describes the placers as follows: "Deposits suitable for mining by large dredges are valley fills formed as a result of Pleistocene block faulting, fills formed by damming of streams by glaciers or glacial outwash during the late Pleistocene, and/or fills formed by aggradation due to an increase in load caused by accelerated erosion under periglacial climatic conditions. The typical valley fill consists of intertonguing depositional units of different origins. Other things being equal, the degree of concentration of the placer minerals is a given depositional unit is inversely proportionate to the rate of aggradation."

Victor Griffith, (left) Warren Dredging Corporation, and E. O. (Ed.) Pothier, mining engineer, J. R. Simplot Company, check the drilling map in the wheat field where Warren Dredging is sampling for monazite.

No Boulders, No Bedrock

To anyone used to dredging gold gravels, the monazite placers are very much a surprise. They contain no boulders and bedrock has never been reached by test drilling. Definite stream channels and reconcentration of the "blacks" is not in evidence.

The monazite and garnet grains are often sharp with perfect crystalline structure, indicating limited water transportation. Rarely are the quartz pebbles as large as a golf ball. In an average area, 80 to 85 percent of the gravel will pass a ½-inch-round-hole drilled plate. However, within the gravel lenses bands of clay are common and reach a thickness of several feet over an area as large as several tens of square feet. Clay and gravel interbanding is not uncommon. The "blacks" occur irregularly throughout the gravel, while good values may or may not be found in the clay. Rich pockets, containing as much as 12 to 15 percent "blacks" are not uncommon. Only a few feet away the gravel will be barren. More than one pay horizon is not unusual although not even limited continuity of any one horizon has been proven.

The nature of the concentrations, as described above, obviously imposes test drilling and evaluation problems which are more fully described below.

Baumhoff-Marshall

The first dredge in the field is owned and operated by Baumhoff-Marshall, Inc., and was moved from Centerville in Idaho's famed Boise Basin gold placer district. The dredge, Yuba No. 106, was built originally for gold recovery and dredged two separate areas in the Basin. It has an 85-foot-long ladder, 80, 6-cubic-foot Columbia buckets and can dig to a depth of 35 feet below the water line. Average daily capacity is 5,000 cubic yards of monazite-bearing sand.

Buckets dump into a 6-foot-diameter by 48-foot-long trommel screen with $\frac{3}{16}$-inch, and ¼-inch round-hole-drilled Yuba plates. The fines flow directly into one of 12 double Pan American jigs. There are six double jigs on each side of the trommel with each set handling sand from a separate trommel section. The jigs are placed below and at right angles to the length of the trommel so that all sand flows across two cells. Rock oversize, of which there is very little, drops from the trommel to the stacker belt. Rougher jig concentrate is pumped by 2-inch rubber-lined Wilfley pumps to a dewatering cone set above the trommel. Thickened concentrate is cleaned and recleaned by two, 2-cell Pan American jigs. Final concentrate flows into a 400-cubic-foot storage tank set amidships on the main deck under the trommel. A 2-inch rubber-lined

Jack Fischer (left) dredge master, and A. F. Baumhoff, president of Baumhoff-Marshall, Inc.

George A. McHugh, who coordinates J. R. Simplot Company's interests in the Idaho monazite dredging operations.

Miles Young, (left) dredge master, and H. B. Murphy, president of the Idaho-Canadian Dredging Company.

Wilfley pump set in the pontoon below the tank is used to batch-pump the concentrate ashore through a 2-inch-diameter rubber air hose.

Fred Baumhoff, long-time Idaho dredge operator, is president of the firm and Jack Fischer, experienced gold dredger, is dredge master.

Idaho-Canadian

The Idaho-Canadian Corporation is operating its 6-foot dredge ¼ of a mile west of the Baumhoff-Marshall dredge. Operating on a bench with deeper "pay," it has been able to dredge a large area to a depth of 45 feet. An average of 5,000 cubic yards is dug daily. This dredge, also, was originally a gold dredge, Yuba No. 142. It was first operated at Bearmouth, Montana and subsequently moved to the Boise Basin. The digging ladder is 93 feet long and there are 84 buckets in the bucket line. The 6-foot-diameter by 48-foot-long trommel is equipped with Yuba plate screens drilled with $\frac{3}{16}$-inch-diameter round holes. The small diameter hole means that more oversize is placed on the rock pile behind the dredge and permits more efficient jigging. "Blacks" is recovered in 30 Pan American and Yuba rougher jigs and cleaned in three 2-cell Yuba jigs. Wilfley rubber-lined sand pumps are used for pumping rougher concentrate to the cleaner jigs and from the main deck storage tank to the bank washing plant ashore.

H. B. Murphy of Boise is company president and Miles Young is dredge master. Much of the monazite dredging practice, as described below, has been reported by Mr. Young.

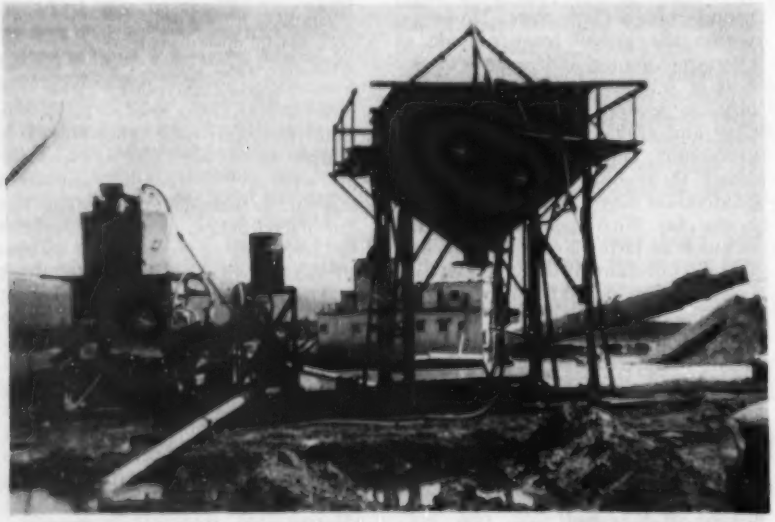
The Warren Dredging Corporation operated its four-foot boat west of the Idaho-Canadian dredge until May 1953 when a high pressure pump discharge line broke, filling a pontoon with water and overturning the dredge. Equipment salvage has since been completed.

Dredging Practice

The speed and ease of digging the fine sand in comparison to boulder-filled, gold-bearing gravels is about equally offset when digging the tough clay lenses. There the bucket line speed must be slowed and the clay literally shaved off in thin layers. In those areas where rich concentrations of "blacks" are found, the winchman can readily spot the black sand in the buckets. He immediately slows down the digging rate so as not to overload the jigs with a sudden surge of heavy sand.

Despite the heavy winter snowfall and temperature as low as 40° below zero, dredging is carried on continuously. The pond is narrowed in winter so that ice hasn't a chance to set between dredge swings. Headlines are not used in this snow country and the boat is swung around a single spud.

Due to the fineness of the gravel the stacker belt carries much less than a normal load so it has been possible to shorten the stacker as neither height or length are necessary for stacking. However, the trend is toward smaller openings in the trommel so as to distribute more material to the tailing pile. The Idaho-Canadian dredge has a nozzle on the end of the stacker through which a high pressure water jet can be pumped to settle and level the tailing pile behind the dredge to facilitate final leveling in accordance with recently enacted Idaho state regulations. Pumping water onto the tailing pile also means a clearer pond as the suspended slime is filtered off



Bank screening and dewatering plant for "black" concentrate from the dredge of Idaho-Canadian Dredging Company shown in background. The jig concentrate is pumped into screen (left). Truck loading bin at right.

while the water percolates through the gravel on its way back to the pond.

Abrasion of the bucket lips is severe. On the Baumhoff-Marshall boat, lips last only a year. With no boulders the shock and impact to bucket lips is very small so half lips are being tried. They are welded directly to the worn regular lips.

Miles Young, Idaho-Canadian dredge master, reports excellent service and a lower cost by the use of chilled cast iron bucket lips. They are made in Boise and their initial cost is 12 cents per pound, compared with 30 cents for manganese steel. Initially, it was difficult to make the welded lips stay on. Large chunks of the cast iron bucket would be pulled loose at the weld. However, it has now been found that a phosphorus bronze weld will hold the lips in place and they won't pull off. Trommel plates and screens of drilled AR Yuba plates have also proved to outwear manganese steel plates when the AR plates can be in-place impact—hardened by the gravel passing through trommel.

Despite the fineness of the gravel, it stands fairly well with no trouble experienced by sloughing or running of banks 15 feet above the pond water line. Usually the dredging rate is fairly uniform as it is not necessary to slow down for cleaning bedrock or to dodge bedrock pinnacles.

This is Yuba No. 106 originally built to recover gold but now dredging monazite sands in the Cascade Valley of Idaho for Baumhoff-Marshall, Inc. Average daily capacity is 5,000 cubic yards.

Recovery Practice

Irregularity and wide variations of "blacks" content of the sand give the dredge masters their greatest recovery problem. It is impossible to set the jigs for a uniform feed. The hutches can be empty one minute and completely full within the next. Jack Fischer, Baumhoff-Marshall dredge master, estimates "blacks" recovery at 90 percent. He sets the rougher jigs to pull a large volume of concentrate by using a long stroke. The stroke is set at 300 per minute with a 1¾-inch length compared with 130 at 1¼-inch for gold.

The rougher jigs are bedded to a depth of three to four inches with ½-inch steel shot and crushed magnetite. Bedding on the cleaner jigs is fine shot and fine magnetite to a depth of one inch.

On the Idaho-Canadian boat, the B cells of the two compartment jigs have been raised to the same level as A cells to give a greater surge-load capacity.

For Greater Recovery

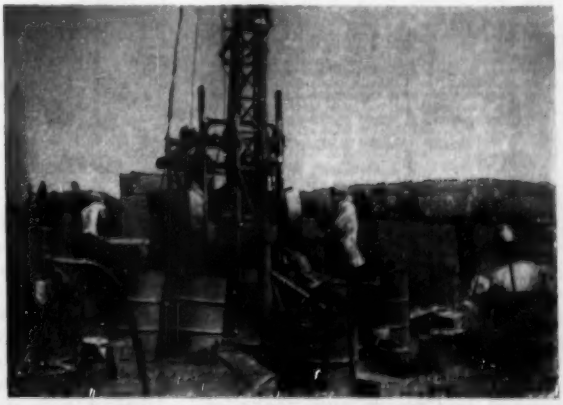
The dredge operators realize that a better distribution system is needed for the sands so that the jigs get a more uniform feed. Idaho-Canadian uses a collection and distribution system of sluices parallel to the trommel in an attempt to achieve this. Jig feed is drawn off at right angles from the sluices.

Elimination of the barren oversize which passes the screens might be effected by use of a shaking screen under the trommel. This would reduce, and more or less distribute, the load to the jigs.

Bank Preparation

The Idaho-Canadian Company operates a moveable screening and dewatering plant on shore for the "blacks." Normal practice is to pump off the dredge during day-time because of easier operating conditions. Rubber-lined pumps discharge

Winchman's view of the bucket line of the Baumhoff-Marshall dredge. There are 80, 6-cubic-foot Columbia buckets in the line.



Elmer Schraft speeds up the Keystone drill. Between 60 and 70 feet of 7½-inch hole are drilled and sampled daily.

"Black" concentrate is pumped ashore from Baumhoff-Marshall dredge and into a 10-ton dump truck through a rubber hose. The truck body is tilted so water will drain from the concentrate.

through a rubber hose which is suspended from a steel cable high above the pond. The bank end is elevated by the truck storage bin and anchored to a deadman. An automatic tension reel on the top deck of the boat keeps the line tight as the boat swings back and forth. After the storage tank has been pumped out, the rubber hose is blown clear with compressed air to lighten load and prevent winter freezing.

The sands are pumped into a Symons V screen with 24-mesh screen cloth. The oversize sand, which is nearly all ilmenite and only rarely includes a grain of monazite, is discarded. Undersize drops to a 3-foot dewatering cone from where the thickened pulp is pumped into a 25-ton steel truck loading bin. Excess water drains off through the bottom doors. The concentrate is not really wet. The particles are all hard and relatively coase. Water is not absorbed but forms only a film around each grain so rapid draining reduces the moisture content in a few moments. Baumhoff-Marshall pumps directly into the tilted box of a 10-ton dump truck parked on the bank to permit rapid dewatering.

The Idaho-Canadian plant requires an auxiliary source of clear water to wash silica out of the concentrate and has not been operated during the winter months. This added washing and screening step insures more effective cleaning and separation at the Boise, Idaho magnetic plant.

Concentrate from both dredges is trucked to Cascade and stockpiled separately on the ground alongside a spur track of the Union Pacific Railroad Company. A Bay City clam shell powered by a Caterpillar D4400 Diesel motor loads the concentrate into railroad gondola cars for shipment to Boise.

Auxiliary Equipment

Both dredging companies operate Keystone churn drills for sampling ahead of dredging. Both operate Caterpillar D8 tractors with bulldozers for building roads, dikes, ditches, and leveling tailing piles.

Test Drilling and Sampling

Several years ago the U. S. Bureau of Mines test drilled on 800-foot centers an area north of the operating dredges in the search for monazite. Warren Dredging Corporation is now redrilling the area with a maximum of 400 feet between holes. The drilling pattern is determined by test results. The basic rule is to drill enough holes to get a good average. In many instances it is difficult to get a trend and correlate it between holes. In some instances it is necessary to drill holes only 50 feet apart to check results. To speed drilling and to save money, Ed Pothier, mining Engineer for Warren Dredging and the J. R. Simplot Company, found as many of the old holes as possible and marked their collar with a 12-foot-diameter circle of lime dust. He then had aerial photographs made of the area on which the whitened holes show clearly. From the Bureau maps he knew the distance between its holes and he has been able to scale the distance to the new holes as the terrain is nearly level. A map made from the aerial photographs has been found to be perfect for a field and working map. Of course, the photograph shows many details which could not be included by a ground-survey map.

Test drilling is done by a C. Kirk Hillman Keystone drill. In one shift an average of 65 to 70 feet of hole is drilled and sampled. Six-inch casing with a 7½-inch drive shoe is used with 2½-foot drives before bailing. Samples are taken every five feet.

Sample preparation has necessitated the development of an entirely new procedure. Washing and recovery of placer gold is done according to long established and proven methods, not so for the "blacks."

The sample volume is first measured, then the slime and gravel volume are measured separately. Next the gravel is screened on a 16-mesh screen with the oversize measured and discarded. During screening all clay lumps are broken. Screen undersize and the slime portion are sacked separately and trucked to the testing laboratory at Boise. The samples are run over a one-half-size Wilfly table where a rough concentrate is produced, containing as much as 50 percent quartz.

After the "blacks" have been recovered, they are put through a laboratory high tension separator where a separation of the conductors and non-conductors is made. For these particular sands, it means making (1) an ilmenite-magnetite product. and (2) a product containing quartz, zircon, monazite, garnet, and some ilmenite and magnetite.

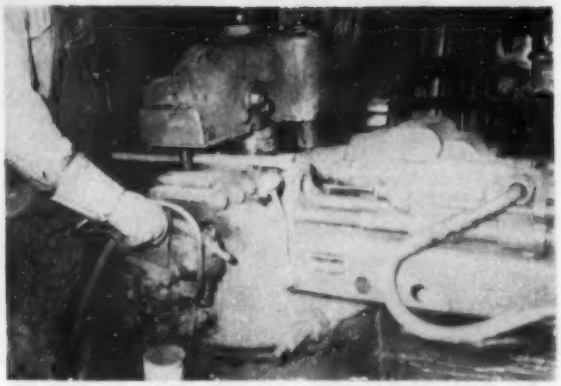
The above mixture (2) is put through the laboratory model induced roll magnetic separator to make the products: (1)quartz and zircon (2) garnet and ilmenite (3) monazite.

The monazite is weighed and the value in pounds per cubic yard is calculated.

All samples are filed away for possible future calculation of the other products in the "blacks."

New District—New Industry

With the partial help of the Simplot organization on the financing end, coupled with the management and engineering know-how of Fred Baumhoff of the Baumhoff-Marshall Company, the United States is no longer dependent upon imports of monazite. Important as this is to the national defense the greatest pride the engineers and the companies take in their accomplishments has been the creation of a new mining industry—using dredges for monazite recovery for the first time—and the making of a new mining district. Proof of the opportunities for creating new mines right here in the United States.



Major equipment includes Ingersoll-Rand shank and bit punch, Type 45SP with a 50 SP sharpener.

KennaSet slotter is a special milling machine for cutting slot to desired depth in forged steel head.

How to Make Your Own Carbide-Tipped Steel

Using Methods Pictured Here, American Zinc Co. of Tennessee Makes Its Own Integral Steel For Lowest Drilling Cost To Date

The answer was ⅞-inch alloy steel, fitted with carbide inserts, step annealed and carefully heat treated.

The problem was simple: How to manufacture or where to buy a drilling steel which would give maximum penetration in the uniform rock at Mascot, and which would yield a total cost of 2¢ or less per foot drilled. Looking for the solution, American Zinc started to make its own steel from Kennametal inserts and one-inch carbon steel. The carbon steel was priced low, and it seemed the likeliest answer. It was not: Cost was slightly under 2.5¢ per foot (total, including sharpening every 180 to 200 feet).

The trouble was in the hollow drill rod itself, not in the brazed carbide-steel connection. As superintendent of mines M. J. Langley says, "we found that our steel was failing a short distance from either end . . . In our heat treatment we had created a 'metallurgical notch'; invisible, but there just as surely as if we had notched it with a file."

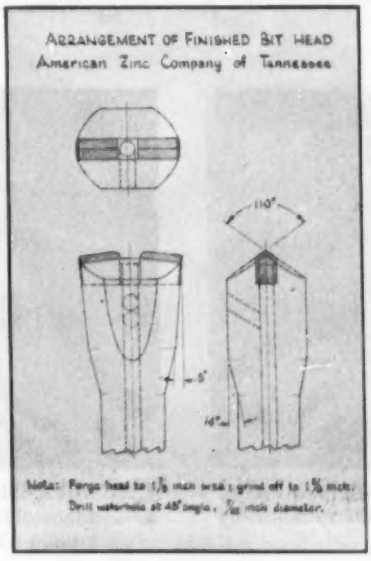
Cuts Drilling Costs

The answer came shortly after September 1953 when the company started using Crucible Steel Company of America's "Double Diamond" ⅞-inch alloy steel. It gave the required top penetration, and it did it at a cost of 2.0¢ per foot, about 0.5¢ per foot lower than the best previous cost. And it is going still lower.

Kennametal, Inc., Latrobe, Pennsylvania, suggested the process. That company's engineers figured that with a few extra items of equipment, most large underground mines could make top-grade carbide-tipped steel at a saving. Douglas L. Tunsberg, a representative of Kennametal, suggested it to American Zinc Company of Tennessee at just the right time. American Zinc was studying the problem of rock drilling with a view to reducing mining costs.

American Zinc gave the KennaSet process its first try in a small blacksmith shop at the Grasselli mine near New Market, Tennessee. Two men, a blacksmith and a bit-setter, run the shop. The blacksmith, Ralph Cain, was an experienced bit forger. The bit-setter, Hubert Daniels, had never worked on a similar job in his life. With training and supervision, he became a first-class bit-setter in a few weeks. He later suggested changing to a side waterhole from a center one; it boosted average footage per steel substantially.

These two men do the entire job. When they work on steelmaking, they complete 12 carbide-tipped drill rods in four hours; they spend the remainder of their time on other duties.


ARRANGEMENT OF FINISHED BIT HEAD
American Zinc Company of Tennessee
110°
5°
Note: Forge head to 1⅛ inch wide; grind off to 1⅝ inch.
Drill waterhole at 45° angle, ⅜ inch diameter.

Leave No Notches

Here's how they make one carbide-tipped steel:

1. Measure to length a piece of ⅞-inch hexagonal alloy drill rod (Crucible's Double Diamond grade). Then cut it: A chisel-pointed hammer struck by a sledge . . . one notch on each of two opposite sides . . . break by a sledge blow.

2. Forge the head and chuck ends. Heat it to steelmaker's recommendation (Crucible recommends 1,750° to 1,850° F. for Double Diamond). Then work it quickly in the sharpener and shank and bit punch. Cool head in mica. Make chuck end the same way.

3. Heat-treat head to milling depth in salt bath (molten lead or zinc can also be used). The temperature here is critical—1,425° to 1,450° F. Cool very slowly in mica.

1. NOTCH STEEL: by hitting on two opposite sides (one blow to the side) with a cold-cutting hammer struck by a sledge.

2. BREAK STEEL: With one notch upward, the steel breaks from a blow of the sledge hammer. Circular base is placed on anvil for breaking.

3. FORGE: Here Ralph Cain, blacksmith, forges the hot steel in the Ingersoll-Rand shank and bit punch. He is making the chuck end.

4. Mill a slot, to receive the inserts, in the bit end. Drill side water hole.

5. Step temper the bit and chuck ends. The tip of the steel is placed in a hot furnace, allowed to heat for about five minutes. Then it is pushed 6 inches further in, allowed to heat for 2½ minutes. Cool in air.

Purpose of this step is to relieve severe metallurgical notches which have been created by forging and upsetting. The so-called metallurgical notch is a sharp variation in hardness (and other properties) in a space of a fraction of an inch. When steel breaks, it almost always breaks at a notch. Step heating replaces these severe notches with a smooth hardness curve.

6. Clean the slot thoroughly with a file and wire brush, plug the waterhole with asbestos paste and then clean with a solvent applied by a soft brush. Purpose of the solvent (carbon tetrachloride or wood al-

4. ANNEAL: This old annealing bath consisted of lime. New bath for alloy steel is thermostatically controlled salt bath.

5. MILL THE SLOT: The KennaSet slotter automatically cuts the slot with a tungsten-carbide milling cutter.

6. CLEAN THE SLOT: Hubert Daniels dresses the slot with a file to make a clean surface and remove burrs. He checks size by placing inserts in position.

7. SET THE INSERTS: Two strips of silver solder go in the bottom of the slot, then inserts and spacer. All are cleaned with solvent then covered with flux.

cohol) is to remove any grease or other material from the head. After the head is clean, even a fingerprint will cause a poorly brazed joint. Cleanliness is extremely important.

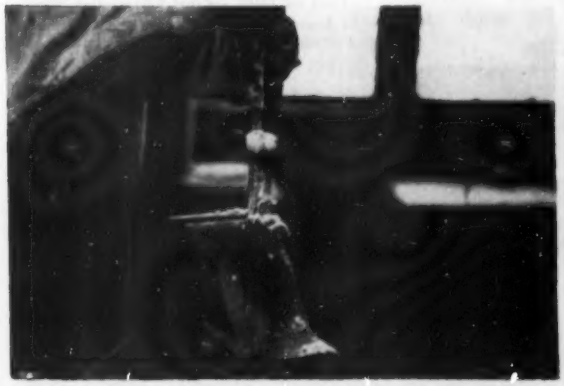
7. Coat entire head with flux—a mixture of three parts of Handy & Harmon Special Handy Flux "Type LT" and one part of Allstate Borax Flux.

8. Using tweezers, place two strips of silver solder, cleaned and coated with flux, in the bottom of the slot. American Zinc uses Handy & Harmon type SS5 silver solder; composition is 40 percent silver, 30 percent copper, 25 percent zinc, and 5 percent nickel; it comes in rolls 0.25-inch wide and 0.02-inches thick.

9. Place cleaned and fluxed spacer and inserts in position. Cover entire head liberally with flux.

10. With a special acetylene torch, heat the head quickly to 1,600° F, playing the flame at the bottom of the slot, where the silver solder is.

8. SOLDER: Torch has two facing tips at 2¼ inches. Bit setter heats head quickly to about 1,600° F. (salmon red) with minimum heat at bottom of insert.



9. COOL: As the steel cools, the bit setter holds it firmly in position by pressing down on both inserts with two files.

10. GRIND: After head has partially cooled, bit setter grinds the head and then buffs off corners of insert on a second grinder.

Hubert Daniels, bit setter, with his insert soldering equipment.

An Atlas-Coromant grinder puts the finishing touch on the steel.

11. Allow to cool in air, holding downward and inward on each insert. Hubert Daniels uses two files to hold them in position.

12. Grind off excess steel around the inserts. Then buff the corners of the inserts slightly on a silicon-carbide wheel suitable for grinding tungsten carbide.

The steel is ready for work.

Side Waterholes

An important step at American Zinc was the change to a side waterhole. Previously, it had used ⅜-inch square nuts (⅞₂-inch thread) as the spacer for a center waterhole; three of them atop one another gave approximately the proper height. After the head was complete, they were drilled out to a ⅞₂-inch waterhole. That left only ⅝₄-inch of wall on each side of the nut. Gauge pressure in the hole pushed in on the inserts, the nuts frequently collapsed; and the inserts failed.

To overcome it, American Zinc changed to a ⅞₂-inch side waterhole, and used a solid steel spacer. That ended nearly all trouble in the bonding of inserts.

From the viewpoint of cost, there are three important considerations. The first is the necessity of making high-quality steel, comparable to that available from manufacturers; American Zinc has this. The second is capital investment required to set up a plant. And the third is cost per steel. The accompanying tables give approximate costs; they will help you to estimate whether local manufacture of steel can save you money at your mine.

The average length of steel at American Zinc is probably nearest to its 7-foot length. The cost per steel in Table No. II is given in terms of that average 7-foot piece; for shorter or longer steel, subtract or add 44.6¢ per foot (cost of ⅞-inch Double Diamond).

Table No. I
Maximum Capital Investment For Equipment To Make Tungsten-Carbide-Insert Drill Rods

Item	*Approximate Cost, New F.O.B. Point of Shipment*
1 Shop building, approximately 15 by 25 feet	$1,000.00
1 Forging furnace (Quote is for Ingersoll-Rand SF-27 complete with firebrick)	635.00
1 Pryometric control for furnace (Quote is for complete I-R unit)	540.00
1 Sharpener (Quote is for IR-40, though large shops may want a heavier model like the IR-54 which costs $3,485.00)	2,905.00
1 Shank and bit punch (Quote is for I-R's 45SP)	645.00
1 Shanking device (quote is for I-R)	231.60
1 Set bit-end formers (Quote is for I-R dolly and die)	125.70
1 Slotter (Quote is for KennaSet slotter)	1,560.00
1 Bit grinder (Quote is for Copco Eastern's Atlas Coromant No. 73/048)	390.00
1 Annealing bath with thermostatic control and 400 pounds annealing salt for initial charge (Quote is for E. F. Houghton's Draw Temp 275)	400.00
Misc. (Includes anvil, vise, hammers, torch, and other items)	74.00
Total (excluding labor and freight)	$8,626.30

Freshly cut piece of steel, cutting head forged ready for slotting, slotted steel, and bit ready for drilling.

Thank You

In the entire bit and steel cost, sharpening and steel repair are two other important items. If workmanship is good, these costs will be about the same for shop-made steel as for purchased steel.

American Zinc has found that sharpening of inserts should be done at least every 200 feet. For that purpose, a workman takes an air-powered portable grinder (RS-710 Atlas Coromant) and spends a few minutes touching up and inspecting steel each day. Mines like North Friends Station, where steel is subject to long footage, are serviced every day; other mines are serviced less frequently.

The information and know how in this article came from American Zinc Company of Tennessee; MINING WORLD thanks the men of that company for a fine gesture in releasing it. Equipment costs came directly from manufacturers; they are naturally subject to changes.

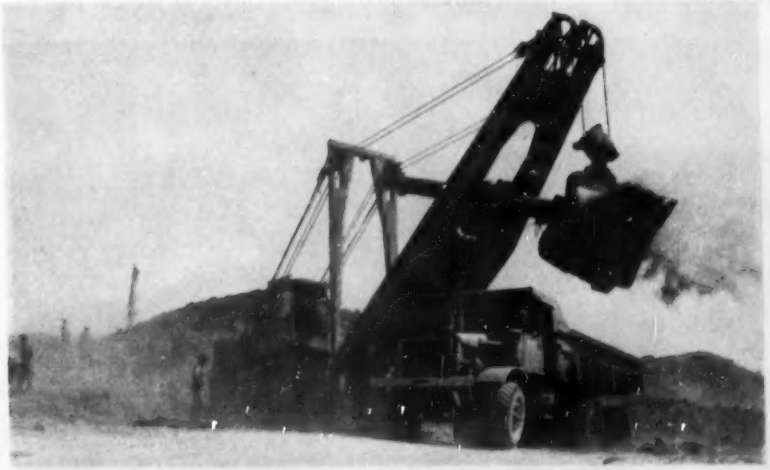
Table No. II
Cost of One 7-Foot Chisel-Bit Steel At American Zinc's Grasselli Mine Shop

Item	*Cost, f.o.b. Point of Shipment*
2 Crown-type carbide inserts (Cost is for Kennametal's 21/32 by 3/8 inch in lots of 500)	$3.22
7 Feet of hollow 7/8 inch hexagonal alloy drill rod (Cost is for Crucible's Double Diamond in mill length lot of 20 tons)	$3.19
3 1/4 Inches silver solder (Cost is for Handy & Harmon's SS5, 1/4 by 0.02 inches in 10-pound lots)	$0.05
Miscellaneous—Includes flux, fuel, solvent, acetylene, salt loss, wear on grinder wheels, files, electricity, etc.)	$0.40
Unchanging costs	$6.86
2/3 Manhour of labor (calculate at your own blacksmithing costs)	$1.20
Freight on steel (usually runs about 5 percent the cost of steel above)	$0.14
Depreciation (calculate this from the capital investment for your mine from Table No. 1)	$0.23
Total Cost	$8.43

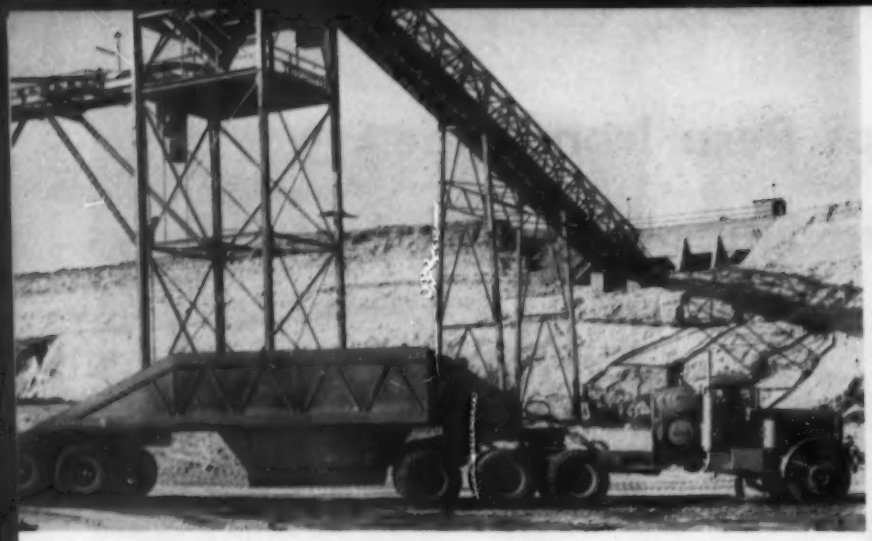
Marcona Equips Peru Iron Mine And Ships First Ore In 90 Days

Marcona Mining Company, formed by the Utah Construction Company and Cyprus Mines Corporation, became one of the world's important iron ore producers in record time in 1953. On January 20 the first men arrived at the small Peruvian port of San Juan, 550 kilometers south of Lima. The first shipment of equipment arrived in February. By April 27 the first ore had been mined, crushed, sized, and trucked to a modernized port with major wharfage equipped with 1,000-ton-per-hour ship-loading facilities. The first 10,000-ton ship sailed on the 30th for the United States. Pictured here is a Joy Champion drill at work in the new mine.

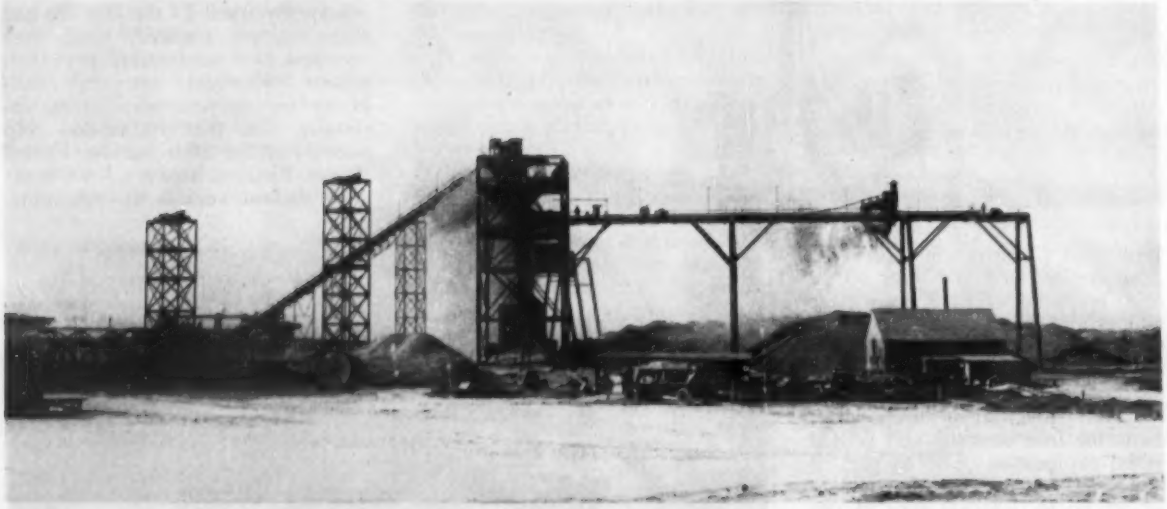
With Utah Construction supervising plant construction and mine operation, preparations have been made to mine and ship a minimum of 500,000 tons of ore annually. This is the figure set in the 30-year contract with the Peruvian Santa Corporation, a Peruvian government firm which owns the iron deposits and started initial exploration. Also as part of the contract, Santa has the right to secure up to 300,000 tons of ore annually for furnacing in Peru. Pictured here is one of the first three open pits developed for mining. Ore from the separate pits is blended. Overburden varies to a depth of 20 feet and averages about five.



One of the two Manitowoc Diesel shovels loads ore into one of the 11 Euclid trucks which haul to primary crusher. In preparation for mining, the overburden is stripped by tractors and carry-alls. Blast holes are drilled with an Ingersoll-Rand Quarrymaster with a six-inch bit and a Joy Heavyweight Champion using a 7⅜-inch rotary bit. Secondary drilling is done with Gardner-Denver sinkers using Timken bits. Diesel-powered, Gardner-Denver, WBK-500, portable compressors furnish air. Trucks from the three pits haul to the primary crushing plant where they dump into a 250-ton bin. Ore is drawn and fed to crusher by a pan feeder.

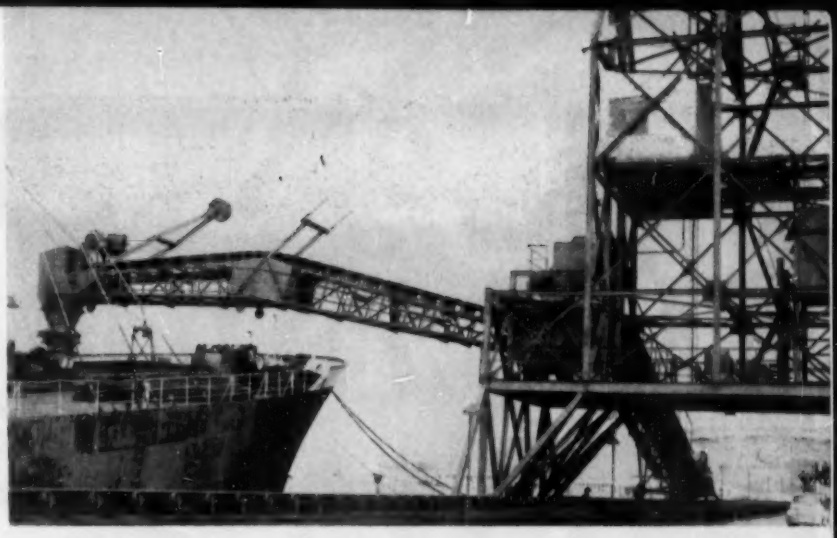


This is one of a fleet of 19 special heavy-duty truck and trailer units used to haul 60 tons of ore per trip. Kenworth tractors with 300-horsepower Diesel engines haul bottom-dump Fruehaff trailers. It takes 1½ hours to make a round trip between mine and port, including time to load and unload. Loading at the mine is into top of trailer units from an ore bin. Note the special extra axle and tires at the rear of the tractor unit and the double suspension of the front end of the trailer. About 120 loads of ore are hauled per day. At the port the ore is dumped into a bin at the top of a hill.



ABOVE: Screening plant and stockpiling conveyor at the mine. The inclined belt at the left carries crushed ore from the 66- by 84-inch jaw crusher to the screening tower in center. Two three-deck vibrating screens size the ore which is then conveyed and stockpiled. Ore is reclaimed by underground conveyors.

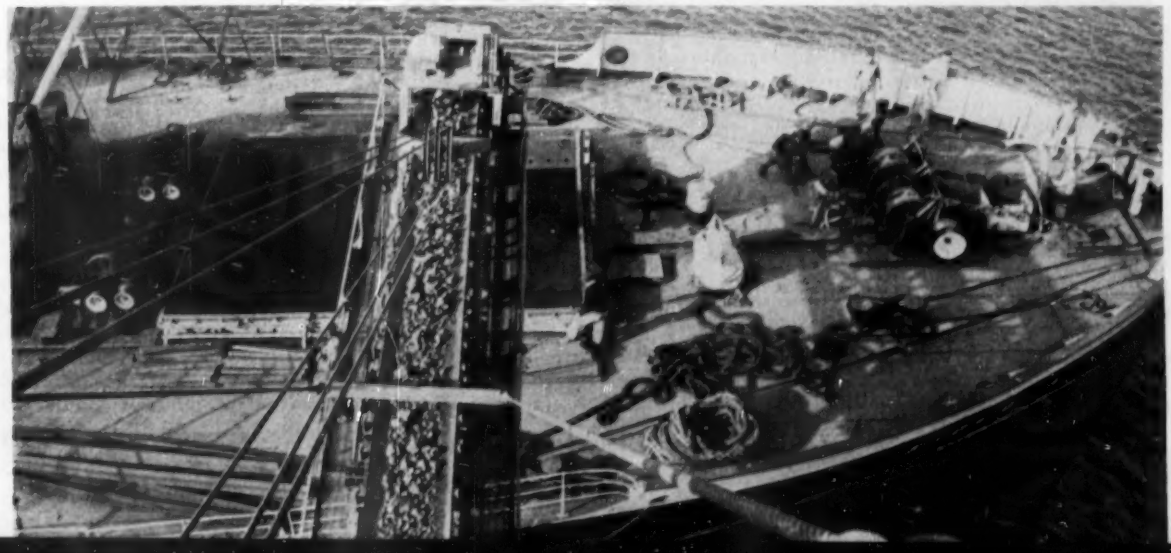
BELOW: This is a section of the new double-lane highway between the mine and the Port of San Juan. Marcona built six kilometers from the mine to an existing road whose 23-kilometer length was practically rebuilt. The paved road is constructed with special raised markers on dangerous curves to prevent passing.



Ore loading tower on the wharf at the port of San Juan where Marcona constructed an 1,100-foot-long pier in record time. Water depth alongside the pier is from 34 to 52 feet. The shore end is rock fill for 170 feet and the rest of the pier is built on steel piling. A Stephens-Adamson conveyor belt system transports the ore from shore stockpiles along the north side of pier to the movable gantry where it is elevated, dropped to a second belt extending out over the ship, and dropped into the holds through an elephant trunk. The conveyor over the ship can be positioned in accordance with ship size.

ABOVE: The Bay of San Juan is now one of Peru's busiest harbors. Shown at anchor are six freighters waiting to load, while a seventh lies along side the pier's north side for loading. Most ships are World War II Liberties which are now flying the flags of Great Britain, Greece, Italy, and Denmark.

BELOW: Marcona ore drops into this freighter at rate of 1,200 tons per hour. After 16 days at sea it will be unloaded at the Fairless Works of the United States Steel Corporation at Morrisville, Pennsylvania. Imports from Peru have grown from 19,850 tons in May to 104,200 in June, 115,250 in July, 94,700 in August, 52,301 in September, and 155,750 in October.



President Eisenhower speaks informally to the section on Domestic Problems of Nonfuel Minerals. (Center) A serious discussion is underway concerning minerals with many government men in attendance. (Right) Horace M. Albright, president, United States Potash Company, opens the Research For Future meeting.

Resources For Future Meeting Hears Industry And Government Views on Minerals Problems

The Mid-Century Conference on Resources For The Future initiated and sponsored by Resources For The Future, Inc. was held in Washington, D. C. in December 1953. Resources For The Future is financed by funds from the Ford Foundation. Its purpose is described as being " . . . devoted to research and education in the field of resources development and conservation."

At the recent conference one section was devoted to Domestic Problems of Nonfuel Minerals. The conference chairman, vice chairman, and steering committee had proposed four main questions for discussion. They are as follows:

A. Should tax changes be made to stimulate the domestic mining industry to more exploration and more efficient extraction? If so, how, and to what extent?

B. What new steps should be taken, if any, toward developing and applying new techniques in the mineral industry?

C. Does the claim-patent system, as it exists in the laws governing mining activities on public lands, need revision because of present abuses, administration difficulties, or because of a need to encourage exploration, development, and the use of new techniques of discovery?

D. In what other ways, if any, should government further mineral exploration and development?

Howard L. Waldron, New York Editor of MINING WORLD attended the Conference and served as one of two invited "rapporteurs" for the section on Nonfuel Minerals. Abstracts from his official co-authored report covering the meeting include:

Question A. The group agreed that because of the steadily increasing cost of finding additional ore reserves in the United States, the $75,000 limit on expense of exploration costs should be removed.

The group agreed, in principle, that revenues from production out of a wasting-asset enterprise, based on an ore body of uncertain extent, should not be considered as income until the investment has been recouped.

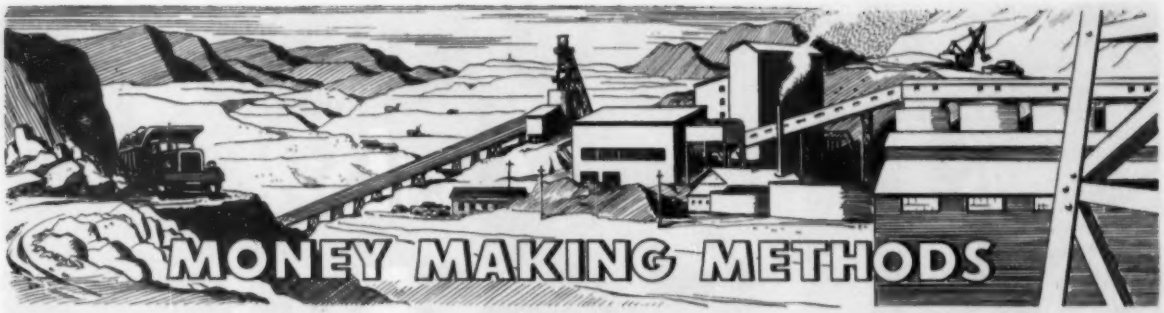
There is no present need for increasing depletion allowances. It was stated that as a special case that uranium production on the Colorado Plateau is hampered by inadequate depletion allowances.

The group approved the general idea of an initial period of tax exemption for new mining enterprises, such as exist in Canada.

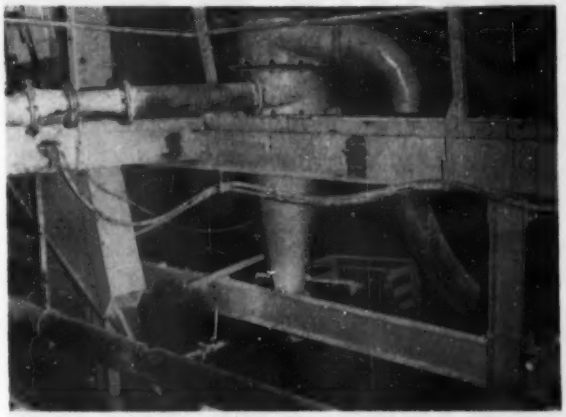
Question B. In the field of earth science, well-organized research is being conducted. Discussion brought out, however, that an accelerated and enlarged research program is necessary to increase production for the future. Who should do the research? General agreement called for an all-fronts attack by government, private industry and universities.

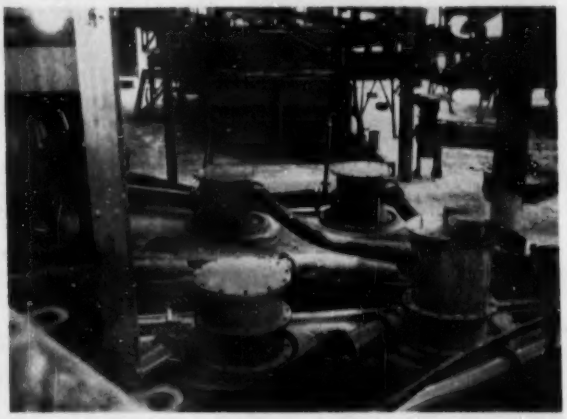
Question C. In regard to the mining laws the group felt that: Basic principles of mining law have proven effective and should be retained; that abuses of the claim-patent system should be corrected; and that full assessment work should be preformed; that the multiple use principle on unpatented claims so long as such use does not materially interfere with mineral, exploration, development, and mining should be endorsed; and that provisions encouraging new methods of prospecting should be written into law.

Question D. Considered under government aid were the tariff, import quotas, flexible tariff, direct subsidy, government purchase programs, a combination of tariff and subsidy, and fixing of special tariffs. Endorsed were federal financial aid for exploration for strategic minerals, and aid to prospectors and small mine operators.



MORE ON USE OF CYCLONE CLASSIFICATIONS IN SOUTH AFRICA





"Can Cyclones Replace Mechanical Classifiers" was the title of a special article in the January 1954 issue of MINING WORLD by M. J. Dennehy. It has been of such interest in world-wide metallurgical circles that two special photographs have been obtained to show how the classifiers are installed and used in both the primary and grinding circuits at the gold cyanide mill of the Rand Leases (Vogelstruisfontein) Gold Mining Company Limited near Krugersdorp, Union of South Africa.

The picture at left shows one of the 27-inch, 20° primary cyclone classifiers in closed circuit with a 9- by 10-foot ball mill. The feed to the cyclone (ball mill overflow) enters at upper left. It is 64.6 percent plus-48-mesh, 13.4 percent plus-100-mesh, 6.7 plus-200, and 15.3 minus-200. Cyclone overflow (upper right) is 31.0 percent plus-48-mesh, 23.0 plus-100, 15.0 plus-200, and 32.0 minus-200. The underflow which is recirculated to the mill for further grinding can be seen flowing out of the bottom of the cyclone. It is 70.0 percent plus-48-mesh, 15.0 percent plus-100, 6.0 plus-200, and 9.0 minus-200.

Four of the ten 27-inch, 20° cyclones in the secondary circuit are shown at the right. The overflows shown discharging into the launder flow by gravity to the cyanide section of the mill. Overflow is 0.2 percent plus-48-mesh, 7.6 plus-100, 22.6 plus-200, and 69.6 minus-200. Cyclone underflow which goes to tube mills for regrinding is 29.0 percent plus-48-mesh, 40.5 plus-100, 17.0 plus-200, and 13.5 minus-200.

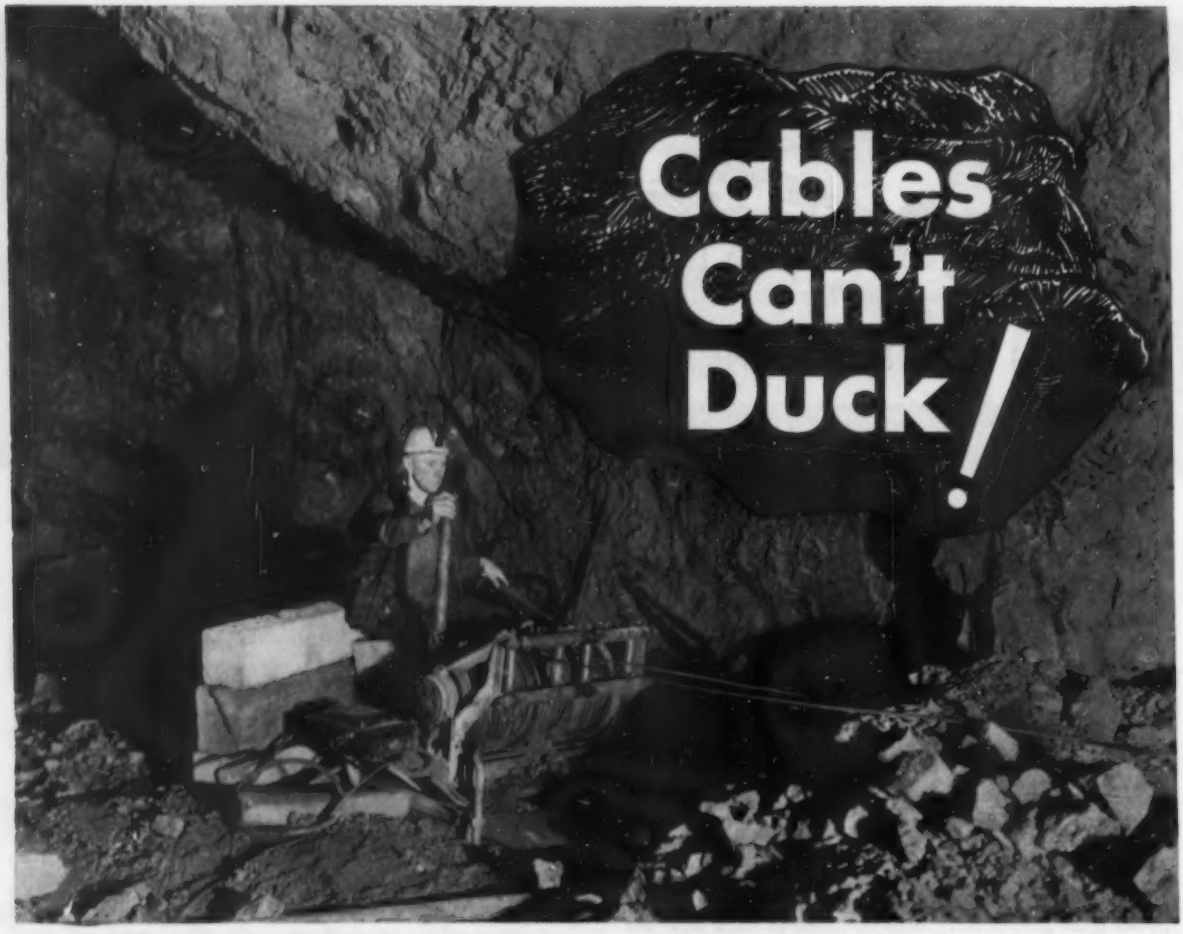
Primary tonnage is 3,900 tons per day and 1,800 tons per day is reground in the secondary circuit at the Rand Leases mill.

CONCRETE BLOCKS DO A GOOD JOB UNDERGROUND

At its operations which center in Mascot, Tennessee, American Zinc Company of Tennessee is using an increasing number of precast concrete blocks underground. They are easy to bring into the mine; and they are water- and rot-proof. But they are not strong in compression, and should not be used to take loads.

Concerning the installation in the photograph above, mine foreman Glenn Hurst says: "This is a permanent structure near No. 2 shaft. Formerly it was boarded up with wood, and we had to replace it every two or three years. Concrete block walls are permanent. We are replacing as many wooden structures as we can with concrete block."

One fine use for the blocks is in underground mine offices. "Red" Wyrick, foreman of No. 12 level at No. 2 mine, has a clean office near the station. Walls are concrete block. Floor is a concrete slab. It is equipped with a desk, filing system, work bench, and good lighting.



Portable cables for slusher hoists can't duck flying pieces of ore, spalling rock, water and mechanical abuse. They have got to stay put and take it. For these reasons you need more than a good power cable; you need the best that money can buy. Cables that can stand up under these tough operating conditions are the only kind that can help turn in a profit. The profit-making, loss-preventing kind is TIREX.

Simplex-TIREX power cables have a *tough, cured-in-lead, selenium-neoprene armor* to assure extra-long life. This special armor gives balanced resistance to abrasion, water, grease, oil and flame. It is this special balance of properties that makes TIREX Cables last longer and thus enables you to scrape more tons of ore.

Remember to specify and get Simplex-TIREX Cables for all your portable operations, including slusher hoists. These cables are marked "Simplex-TIREX" for your protection.

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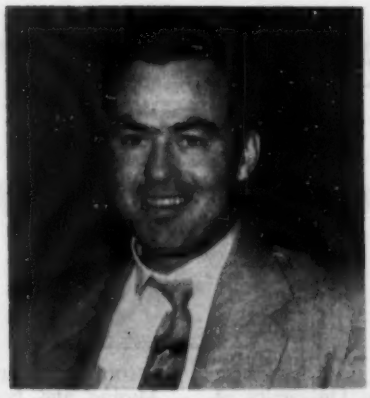


Underground mining methods were the subject of talks by Henry Mutz, (left) general superintendent of mines for International Nickel, and G. A. Dawe, (center) assistant superintendent, Mather A mine of Cleveland-Cliffs. Earl C. Herkenhoff, (right) Pickands-Mather metallurgist was session chairman.

Minnesota Symposium Compares European and USA Iron Mining

Once again the annual Minnesota Section meeting of the American Institute of Mining and Metallurgical Engineers showed an increased attendance over any previous meeting. The 27th meeting was held in Duluth on January 11 in connection with the University of Minnesota's 15th annual Mining Symposium which followed on January 12th and 13th.

The program of both the AIME meeting and the Mining Symposium varied from previous years in that it did not center upon activities in the Minnesota-Michigan area, but went further afield to operations in Norway, Sweden, and Africa, as well as Canada and other areas of the United States.

Professor S. A. Tyler was the first of several speakers to discuss Swedish iron ores. Professor Tyler, with the use of appropriate slides, covered the iron ore formations of central and northern Sweden as well as those in adjacent Norway. He said that the known iron ore reserves of this area are in excess of 2,800,000,000 tons. Magnetite is the predominant mineral with some specular hematite and martite.

Scandanavian Visits Described

Forbes Cronk, formerly chief engineer of the Oliver Iron Mining Company (now Oliver Iron Mining Division, United States Steel Corporation), had recently returned from a trip to Sweden and Norway and gave an interesting account of his contact with the iron industry in that area. Mr. Cronk pointed out that Swedish ore was being shipped to both the United States and Canada, and, in turn, ore from Wabana, Newfoundland was being shipped to England. This is brought about by the special characteristics of the Swedish iron ore which make it desirable for certain applications to which no ore on this continent is adaptable.

Fred DeVaney, chief metallurgist, Pickands Mather & Co., described a trip made in January and February 1953, to A/S Sydvaranger at Kirkenes, Norway to study winter operations of this modern taconite plant. This operation was covered by a comprehensive report in the October 1953 issue of MINING WORLD. Mr. DeVaney pointed out the differences between operations at this plant and those at the taconite plants now under development on the Mesabi Range, and some of the reasons that Mesabi Range practice is at some variance with Sydvaranger practice.

To conclude the program on Sweden and Norway, Dean Thomas L. Joseph of the University of Minnesota discussed the use of Swedish iron ore. He pointed out that Germany is one of the main users, and that emphasis is based upon quality rather than quantity. By careful work they have been able to reduce coke and limestone consumption and increase pig tonnage over the past years. He pointed out that sponge iron will probably replace pig iron as the main product of Swedish producers.

Taconite—Problem and Promise

E. M. Richards, vice-president of Republic Steel Corporation, in addressing the dinner session took a comprehensive look at the iron ore situation in the Great Lakes area. Continued supremacy of the Great Lakes region as the greatest industrial area of the world depends on the successful development of taconite beneficiation in the Lake Superior region and upon foreign ores, he said.

Mr. Richards, who is in charge of planning and development for Republic Steel, pointed out that the Great Lakes region with only 0.75 percent of the land area in the world and with only 2.0 percent of the population does the stupendous job of producing over 35 percent of the steel made on the entire globe.

Development of the taconite industry in Michigan, Wisconsin, and Minnesota is rife with problems, he pointed out, adding that the facilities to beneficiate this iron-bearing rock into a useable product are tremendously expensive—costing from $30.00 to $40.00 per annual ton of pelpets produced. For the projected 40,000,000-ton-per-year capacity an investment of about $1,500,000,000 will be required. The actual production will be expensive, tremendous quantities of electrical power must be generated, and water consumption will be enormous.

Scandanavian iron ore was discussed by three speakers: Dean Thomas L. Joseph (left) of the University of Minnesota discussed its use. Professor S. A. Tyler, Minnesota professor of geology reported on its occurrence. Mining and beneficiation were described by Forbes Cronk, former chief engineer for Oliver Iron.

However, great benefits to the Lake Superior region will accrue from the taconite development.

The present industrial activity in the Great Lakes region will be maintained. More fuel and electrical power will be available in the region. Greater employment opportunities will arise with resulting increases in personal income. More uniform economy will result since taconite operations will continue 12 months a year.

Taxes Must Be Equitable

To realize these benefits, however, he said, "The people and their legislators should give the taconite industry confidence that its problems will be recognized and assurance that it will live in a sympathetic atmosphere.

"So far, the legislators have shown their wisdom by adjusting the mining tax structure to encourage the development of the taconite industry. That is a logical and common sense approach. Let me say it is very important for the health of this taconite industry and for the region to continue that attitude. It should be recognized that the major income of the states cannot come from burdensome taxes on taconite. Bad judgment in taxes here would be disastrous to this area because if high costs make taconite non-competitive, the new industry will not grow. No tax revenues can come from plants never built or jobs never created."

G. A. Dawe, assistant superintendent of the Mather A mine of Cleveland-Cliffs Iron Company, discussed mining and development operations at the Mather A and B mines near Ishpeming, Michigan. Mr. Dawe covered the history and development of these properties and showed slides illustrating the oval-shaped steel sets now being used at this property. Another interesting point was the underground conveyor system which includes turning the belt 180 degrees at each end to avoid spillage along the entire length.

Planning For White Pine

Harold B. Ewoldt, vice president of White Pine Copper Company, presented a paper jointly authored by Warren L. Howes of Western Knapp Engineering Company, George M. Reaves of Turner Construction Company, and himself, covering the planning, designing, and implementation of the White Pine Copper development in northern Michigan. Of special interest was the considerable amount of pre-planning and studies that were made of the living habits and families of potential employees at this operation. This information was used in designing and developing the townsite and related services. Walter Hamilton, mill superintendent at White Pine, answered a number of questions on the milling methods to be used.

Development of the Grace mine at Cornwall, Pennsylvania by Bethlehem Steel Corporation was described by Sheldon J. Shale, manager of Bethlehem's Cornwall Division.

Two 3 000-foot-deep shafts are being sunk at the Cornwall mine to develop the iron ore body which is predominantly magnetite. The ore will be beneficiated and pelletized for shipment. The Grace mine was discovered by airborne magnetometer surveys and all of the land was acquired before any drill holes were actually put down. Slides showed a particularly imposing surface plant installation of brick and tile. Production is expected to start in 1958, with about 2,000,000 tons per year of concentrate.

Planning From Scale Models

Those in attendance at the Symposium heard an interesting report on the operations of International Nickel Company of Canada, Ltd. by Henry Mutz, general superintendent of mines. Mr. Mutz discussed the general geology of the area with emphasis on the present status of the various mines. Sand filling of worked out areas has become an important part of International Nickel's operations. In studying both mining and development methods, scale models are used to simulate actual underground conditions. Mr. Mutz used diagrams and slides to illustrate problems encountered with such phases as drilling, slushing, hoisting, ventilation, drainage, and pumping.

R. A. Sims, general superintendent of Anaconda Copper Company's Butte operations, reported on the development of the Kelly shaft and the Greater Butte Project. The Kelly shaft started hoisting in April 1952 with a capacity of 12,000 tons per day which can be doubled in the future if necessary. Reserves in this mine are estimated to be in excess of 150,000 000 tons of 1.0 percent copper ore. Slides were used to illustrate block caving methods and the development of the shaft.

Scholarships And Officers

A business meeting of the Minnesota section disclosed that section membership increased by 69 during the year. Reports were made by committee chairmen, and scholarships valued at $4,000 were voted by the membership for students at the University of Minnesota who are interested in mining and related fields.

Officers elected for 1954 are Kenneth Duncan, retired manager of ore mines for Pickands Mather and Company, chairman; M. F. Williams, Jr., Oliver Iron Mining Division, first vice chairman; A. W. Kangas, Hanna Iron Ore Company, second vice chairman; O. A. Sundness, Snyder Mining Company, third vice chairman; and Henry H. Wade, Mines Experiment Station, University of Minnesota, secretary-treasurer.

Muriel Sibell Wolle Describes

ATLANTIC CITY: WYOMING GOLD CAMP

Atlantic City, Wyoming, is tucked away at the bottom of a gulch with its few remaining houses dotting the sides of sagebrush-covered hills. It is a relic of the first gold rush to the state, when, with its neighbor, South Pass City, it was the center of a rich placer area known as the Sweetwater District.

A few log cabins dot the rolling, treeless hills on either side of the stream and half-a-dozen false fronted stores weather beside the main street. A frame church with steeple and bell, a schoolhouse built of chinked logs, Hyde's Hall, a one-story stone building, a large store with wooden loading station in front, and a hotel comprise the heart of the town as it is today.

Atlantic City's boom began in 1868 and lasted until 1872. Mill foundations, dumps, and deserted mine workings testify to the scale of its former activity. Since 1872 only intermittent mining developments have kept the town and the district alive.

The first gold to be discovered in the Sweetwater district was found in 1842 by a Georgian who, in search of health, joined the American Fur Company on one of its western expeditions. He remained a year in the west and then started home, only to be killed on the way by Indians, if reports are reliable. The next traveler to inspect the area was Alonzo Delano who journeyed across the western prairies and in 1853 published an account of his trip. His book, *Across the Plains and Among the Diggings*, not only mentions placer gold but exclaims at the number of dead cattle found beside the trails. He believed that cattle, like humans, were affected by altitude, and that many animals died when hurried across the high country because of "the rarification of the air."

Thirteen years after Delano's trip, a party of 40 men reached the Sweetwater and prospected the length of the river. They found traces of gold everywhere and they even sank a small shaft. They spent the winter at Fort Laramie and early in the spring outfitted and started back toward their diggings. But the officers at Fort Laramie refused, on some technicality, to allow them to proceed and they were forced to abandon their expedition. In 1858 the leader of the group returned and found colors in Strawberry Gulch, and in 1860 he and 18 others worked the gulch. (The remains of their sluices and rockers were visible for years after they had left the area.)

Nothing more was done until the summer of 1866 when a detachment of General Connor's troops (then stationed at Fort Bridger) scouted into country north and east of the Oregon Trail's crossing of the Continental Divide at South Pass. Several of these soldiers had been miners in California and Nevada and they at once recognized the mineral characteristics of the soil. As soon as their military service was completed, they organized and equipped a prospecting party, and in the fall of 1866 they found not only small outcroppings of gold but the Carissa claim, which soon became the most profitable in the area. All through the winter of 1866-1867 the men worked their claims but spring brought raiding bands of Indians to annoy them and steal their horses.

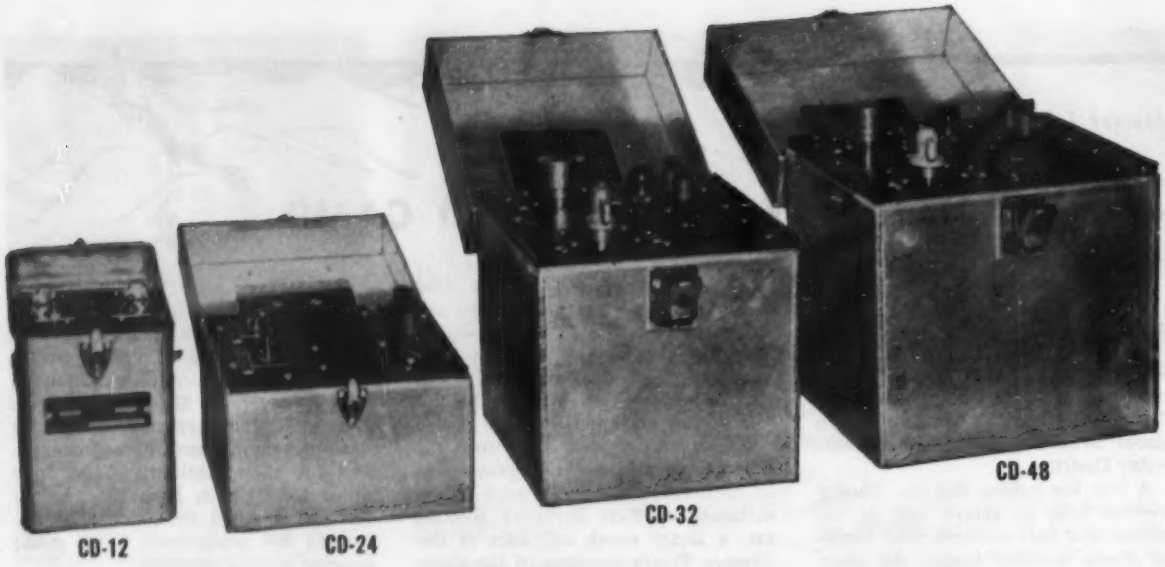
News of the discovery of the Carrissa lode reached Salt Lake City, Utah and a party of 30 led by a man named Lawrence started for the gold fields. On the way they were attacked by Arapahoe Indians and Lawrence and another man were killed. The rest promptly abandoned the venture. Later in the year, other parties filtered into the area and a camp called South Pass City sprang up close to the rich placers near the Carissa lode. These placers paid "on a small scale" and were worked intensely. Before they were exhausted they had yielded $2,000,000 in gold. Before the diggings played out several new camps mushroomed nearby. One of them, Atlantic City, four miles from South Pass City, materialized in April 1868, and soon attracted 300 prospectors to its gold-bearing quartz deposits.

On January 1, 1869, the legislature also approved "Articles of Incorporation of the Atlantic City and South Pass City Wagon and Toll Road Company . . . for the purpose of constructing, furnishing, maintaining, and enjoying a wagon and toll road . . . by the most direct, feasible route between the two points aforesaid and within said county of Carter". By 1870 two stage lines were making daily runs between Point of Rocks and South Pass and Atlantic Cities.

Indians were troublesome between 1862 and 1869. Seeing the unprotected condition of the settlers and miners, they attacked and harrassed them whenever an opportunity arose. The miners therefore carried arms and even posted guards to protect them while at work.

Within the first three years Atlantic Gulch alone yielded gold valued at $15,000 and Rock Creek, Little Beaver, and Smith Gulch were all

A church, school house, Hyde's Hall, the hotel, and a large store form the heart of Atlantic City today.



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Characteristics of Condenser Discharge Blasting Machines

Model	Rated Voltage	Capacity with Leading Lines Not Exceeding 3.0 Ohms Resistance			
		Straight Series		Straight Parallel	Parallel Series
		Primary	Secondary		
CD-12 Weight 4 lb Width 4 in Length 5¼ in Height 7 in	120	20	30	NR*	NR*
CD-24 Weight 12 lb Width 7½ in Length 8¼ in Height 6½ in	240	50	75	NR*	240 (6 series of 40 each) (8 series of 30 each)
CD-32 Weight 22 lb Width 9½ in Length 9½ in Height 10½ in	320	50	125	30	480 (10 series of 48 each) (12 series of 40 each)
CD-48 Weight 27 lb Width 9½ in Length 11 in Height 12¼ in	480	50	200	60	1,200 (24 series of 50 each) (30 series of 40 each)

*NR means not recommended for the purpose.

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worked successfully. The best lode mines were discovered in 1868 and 1869. The Buckeye, just north of Atlantic City, was opened in 1868 by John McTurk and his partners. It soon became a producer and by 1869 was in full operation. The Jim Dyer (later known as the St. Louis) was discovered late in 1868. The Robert Emmett or Franklin was discovered by John Bilox; the Europe (later called Dr. Barr or El Dorado) was uncovered by Anton Stribo; the St. Lawrence by Dr. Leonard; and the Mary Ellen and Young America were also opened. The Alice Lawn, later called the Alice Davis, and still later the Rosella, Soule & Perkins mine, with development produced $75,000 in gold. The Caribou, another 1869 discovery, yielded $50,000.

To handle the ore from the many mines, stamp mills were quickly built—the Elkhorn and Amoretti, Tom Collins' 10-stamp mill, and Colonel Elliott's 30-stamp mill. In 1870 another 10-stamp mill was built on Rock Creek and in 1875 Wheeler and Hull constructed a similar mill above Atlantic City.

By 1870 the population of the city had reached 2,000 but by the end of 1871, the rich pay streaks in the placers were worked out and the remaining ore was refractory. Mining dwindled and the population began to move away. A rumor of gold in the Big Horn Mountains of Wyoming started a rush to the new field and further depopulated the city.

In 1884, Emile Granier, representing a group of French capitalists, acquired title to several miles of placer ground along Rock Creek. This he proposed to work by means of hydraulic pipes and a hydraulic elevator, for handling tailing. He spent years and much money constructing ditches and the hydraulic plant which upon completion proved a failure.

Next, the Dexter Mining and Development Company obtained 1,100 acres of placer ground and drove a cross-cut tunnel to Rock Creek. The company obtained water for its hydraulic elevator from Christina Lake in the Wind River range, constructing 25 miles of ditches and flumes, as well as storage reservoirs, to bring a sufficient supply to the workings. In 1904, D. G. Cahoon, who had organized the Dexter Company, drove a 1,000-foot tunnel and a mill costing $200,000, and "so designed as to insure its failure." Since neither were practical, the company went bankrupt. The creditors organized the Tim-ba-bah Mining Company and built a 20-stamp mill at Atlantic City. This mill was moved to South Pass City in 1929 to be used on the Carissa property.

The Tim-ba-bah Company made no effort to carry on mining but in 1932 granted a lease on the Rock Creek placers to E. T. Fisher Company of Seattle, Washington. This company brought in a dragline and worked three eight-hour shifts. One shift cleared the banks of brush while the other two mined the rock and gravel. The dredge employed 12 men and worked a strip of ground 120 feet wide. During the summer of 1934, $67,000 worth of gold was recovered. The following year the company again worked the strip and made cleanups every 10 days which averaged $9,000 each. During this revival a few lode mines were reopened, but not for long and today only sporadic leasing is carried on in the vicinity of Atlantic City.

Robert McAuley, postmaster at Atlantic City for nearly 25 years, lived there from 1868 to 1898. During his residence in the town he lived in three counties—Carter, Sweetwater, and Fremont; two territories—Dakota and Wyoming; and one state—Wyoming, without moving his house or place of business.

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ACTIVITIES OF U. S. MINING MEN

C. J. ABRAMS (left) will head a newly created exploration division for the Climax Molybdenum Company, with major operations in the Colorado area. Succeeding him as general manager of western operations for the firm is FRANK COOLBAUGH (right). Mr. Coolbaugh was formerly the resident manager at Climax. Mr. Abrams has been with the firm since 1928, serving as manager of western operations since 1951. He will remain in Denver while assuming his new post.

Fred Searls, Jr. is the new chairman of the board of directors of the Newmont Mining Corporation, succeeding **Charles F. Ayer,** who has retired. Mr. Searls, who was named at a recent meeting of the board in New York City, formerly was president of the company. This position has been filled by **Plato Malozemoff,** who was a vice president in the company. Other changes at the firm were the election of **Philip Kraft** and **Marcus D. Banghart** as vice presidents and the retirement of **Franz Schneider** as executive vice president. Mr. Schneider will continue as a consultant for the company.

F. A. McGonigle, general manager of Manganese, Inc., has been named vice president of the firm. He will continue as general manager of the company's plant in Henderson, Nevada. Among the new staff members at Manganese, Inc. are **Darrell D. Kroenlein, Edward P. Frapps,** chemist, and **Edward B. Lowman,** assistant to the mill superintendent.

Charles Will Wright attended the December meetings of the Mid-Century Conference on Resources in Washington, D. C. as the delegate of the Society of Mining and Metallurgical Engineers. Prior to that time, Mr. Wright had been examining uranium deposits on the Colorado plateau.

Paul T. Allsman has been named regional director of the Bureau of Mines Region VII. Filling a post which has been vacant since 1952, Mr. Allsman will make his headquarters in Knoxville, Tennessee. He will be responsible for Bureau activities in the southern states and in Puerto Rico, the Virgin Islands, and the Panama Canal Zone.

Elwood Strom is the new assistant metallurgist at the U. S. Atomic Energy Commission Uranium Plant in Monticello, Utah, which is operated by the Galigher Company. Mr. Strom formerly was employed by the State College of Washington.

Earl F. Elstone is the new president of the Western Montana Mine Owners and Operators Association. **A. J. Mosby** was elected executive secretary.

George Burnhan has been transferred to Philadelphia to take over duties as the assistant to the vice president of the United States Steel Corporation. Mr. Burnhan was supervisor of personnel and training with the Oliver Iron Mining Division in Duluth, Minnesota.

M. E. Volin, head of the U. S. Bureau of Mines' Region II in Spokane, Washington, has been promoted to regional director of the Bureau's Region V in Minneapolis, Minnesota.

L. M. Kinney was elected chairman of the Columbia section of the American Institute of Mining and Metallurgical Engineers for 1954. Mr. Kinney is general superintendent of the Pend Oreille Mines and Metals Company at Metaline Falls, Washington.

Lyle F. Campbell has formed the Lance Exploration Engineering Company to explore uranium ores on the Colorado Plateau. Formerly with the M. A. Hanna Company of Minnesota, Mr. Campbell has set up offices for his new company in Grand Junction, Colorado.

Joseph E. Weston, is now head mining engineer for the Climax Uranium Company of Grand Junction, Colorado.

Charles F. Parker, Jr., has assumed presidency of the New Idria Mining & Chemical Company which has its headquarters in San Francisco, California and a quicksilver mine near Hollister, California.

Additional personnel appointments at the Highland and Trail Ridge plants of the Humphreys Gold Corporation include the following: **W. M. Beam,** planning engineer at Highland; **John Caldwell,** engineer at Highland; **W. O. Cannon,** master mechanic at Trail Ridge; **J. R. Chambers,** du Pont engineering representative at Highland; **C. W. Colson,** accounting clerk at Trail Ridge; **C. E. Devlin,** maintenance superintendent at Trail Ridge; **J. E. Gay,** accounting clerk at Highland; **Herbert Green,** storekeeper at Trail Ridge; **W. H. Hart,** storekeeper at Highland; **J. L. Hetherington,** engineer at Trail Ridge; **Edward Johns,** surveyor at Trail Ridge; **H. P. Kautz,** engineer at Highland; **G. C. Livingston,** purchasing agent at both plants; **John Milligan,** carpenter foreman at Highland; **L. Pickering,** construction foreman at Highland; **R. M. Sasser,** payroll clerk at Highland; **C. T. Smith,** du Pont accountant at Highland; **K. M. Struth,** surveyor at Highland; **Daniel Sullivan,** project engineer at Highland; **A. K. Taylor,** welding shop foreman at Trail Ridge; and **E. V. Whittle,** mine engineer at Trail Ridge.

Robert S. Macfarlane, president of the Northern Pacific Railway Company, and **James Albert Woods,** president of the Commercial Solvents Corporation, have been elected directors of the American Smelting and Refining Company. Both men serve as directors in numerous other companies.

Clifford McIntosh has been elected vice president of the Arthur Iron Mining Company, fiscal agency for the Great Northern Iron Ore Properties. Mr. McIntosh will continue in his present position as chief engineer. He succeeds **Carl J. Calvin,** who has retired, as vice president of the firm. However, Mr. Calvin will continue in a consulting capacity. **William A. Robins** will continue as an assistant chief engineer in charge of the mining inspection department. **William W. Watson** has been appointed as an assistant chief engineer but will continue as head of the research department also.

J. PARNELL CAULFIELD (left) is the new president of the Utah Mining Association. Mr. Caulfield is the general manager of the Kennecott Copper Corporation's Western Mining Division. Also elected by the association were OTTO HERRES (center) who will assume the duties of first vice president, and L. F. PETT (right), second vice president. Mr. Herres is vice president of the Combined Metals Reduction Company, while Mr. Pett is the general manager of the Kennecott Copper Corporation's Utah Copper Division. Reelected by the association were A. G. MACKENZIE, vice president and consultant; MILES P. ROMNEY, secretary-manager; and WALTER M. HORNE, assistant secretary-manager.

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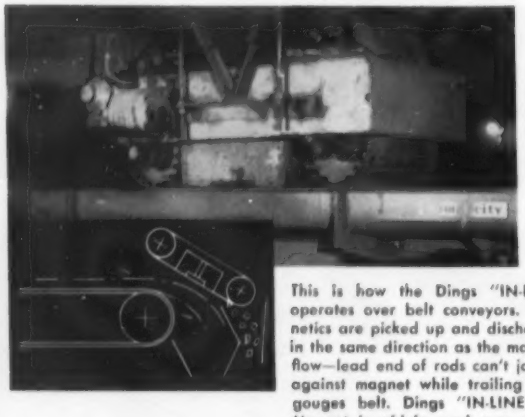

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ACTIVITIES OF INTERNATIONAL MINING MEN

BRYAN R. FRISBIE, Minerals Attache to the State Department for southern Africa, is returning to his headquarters in Johannesburg, Union of South Africa, after a vacation in the United States. Prior to becoming Attache, he was one of the first Americans on the staff of Tsumeb Mines, Ltd., Southwest Africa. He has had extensive operating experience in the western United States and Canada. During World War II, he worked in Arizona for the Mine Loan Section of the Reconstruction Finance Corporation.

John W. Haussermann, president and manager of the Benguet Consolidated Mining Company in the Philippine Islands, is investigating reports of molybdenum and uranium deposits there. Judge Haussermann, who has spent 55 years in the Philippines, stated that if the Benguet survey proves favorable, the company is prepared to make necessary arrangements to develop the area without financial help from the government.

John McCall, professor of mining and geology at the University of Alaska, has been retained as consulting glaciologist for the Alaska Road Commission. Dr. McCall recently participated in a field tour of the proposed Cordova Road in Alaska.

N. H. van Doorninck left the Netherlands last month for Asmara, Eritra. He will be conducting investigations on ore deposits in the former Italian colony for the Ethiopian American Mineral and Chemical S.A.

W. P. Horne, chemist and assayer for the Kenya Government Mines and Geological Department, has been awarded a United Nations Fellowship in Economic Development. He is now travelling through South Africa and England on his way to a vacation leave in Australia.

Lance H. Cooper, chairman of the Mond Nickel Company, Ltd., has been elected vice president of the firm's parent company, the International Nickel Company of Canada, Ltd. He assumed his duties January 1. Mr. Cooper joined the Mond Nickel Company which has properties in both England and Canada, in 1926 and has been chairman since 1951.

WILLIAM D. LORD, JR., has resigned from his position as Manager of Mines after six years of service with the International Mining Company in Bolivia. He plans to return to his home in the United States for a short vacation before seeking new employment.

Leroy Schwarz, who is associated with the U. S. Atomic Energy Commission in Brazil, returned to Rio de Janeiro on "El Conquistador" in October.

R. D. Bradford, vice president of the American Smelting and Refining Company, has been visiting the Mount Isa Mines, Ltd. in Queensland, Australia. Accompanying him are **J. S. Smart,** director of research, who is working with the Electrolytic Refining and Smelting Company in the initial processing of blister copper at the company's plant in Port Kembla, South Wales. **T. J. Woodside,** superintendent of the American Smelting and Refining Company's El Paso, Texas plant has been at Mount Isa acting as consultant to the company in its copper and lead smelter operations.

Sir Ewen M. F. Fergusson, chairman and managing director of the Straits Trading Company, Ltd. which operates in Singapore and Malaya, has been appointed a director of Petaling Tin Ltd. He succeeds **H. H. Facer** who has resigned.

Andrew Robertson has been named vice president and managing director of the Eastern Metals Corporation Limited and Eastern Smelting and Refining Company Limited. Mr. Robertson will also continue in his positions as vice president and general manager of Golden Manitou Mines Limited, Barvue Mines Limited, and Quebec Manitou Mines Limited.

Walter Stohl, chief geologist with the Benguet Consolidated Mining Company of the Philippine Islands has resigned to join the staff of the mining department of the Indonesian government.

Alf Ibanez, former assistant mine superintendent of Baguio Gold Mining Company in the Philippines has joined the staff of Elizalde and Co. at its Masera mine in Davao, Mindanao, P.I.

Oliver C. Ralston, chief metallurgist for the United States Bureau of Mines, is currently on a trip which includes a stop in the Philippines to discuss means of starting an iron and steel industry and possible utilization of nickel ores. Mr. Ralston will be joined by **Stephen M. Shelton,** Bureau of Mines regional director at Albany, Oregon, who is in the Philippines for the U.S. Foreign Operations Administration and the two will go to Northern Rhodesia to work out an agreement for recovery of cobalt which the United States needs. They will confer with officials of the Rhokana Corporation, Ltd., and also will study mining operations in the copper belt of Northern Rhodesia and the Belgian Congo. The two men will also inspect strategic metals recovery operations in South Africa and Southwest Africa and will confer with Tsumeb Corporation officials.

George Shaw of Canada has left for Malaya to study possibilities of conducting an aero-magnetic geological survey of the thickly forested, largely unexplored eastern coastal areas of the Federated States. Mr. Shaw is the first expert in the field of economic development to be sent to Malaya by the United Nations Technical Assistance Administration. Mr. Shaw has explained that the feasibility of using aircraft for geological mapping depends on the extent of magnetic substances in the rock formations of the area to be surveyed.

HORACE W. HIGGS has been appointed assistant general superintendent of smelting and refining for the Cerro de Pasco Corporation. He succeeds J. M. MORTIMER who has resigned to return to Canada. While in his new post, Mr. Higgs will continue to work from La Oroya, Peru, where the corporation's smelting and refining plants are located. He has been with the firm since 1949. Prior to that time, he was a metallurgist for the American Smelting and Refining Company.

Willis Dunne has returned from the United States to become mine foreman for the Balatoc Mining Company in the Philippine Islands. **Al Plesser,** also recently returned from the United States, has been appointed general mine foreman for Itogon Mining Company.

G. B. Blore is now a sectional manager for Rand Leases Gold Mining Company in Florida, Transvaal, South Africa. He was formerly a divisional manager at the South African Torbanite Mining and Refining Company, Ltd., in Breyten, Transvaal.

Mining experts from the German Krupp firm who recently surveyed iron ore deposits in Pakistan included the Messrs. **Weit, Coburgar, Wolf, Haberfelner, Murtaza** (of PIDC), **Weight, Nassmann,** and **Kolk.**

William Gladstone Jewitt, assistant general manager and manager of mines for the Consolidated Mining and Smelting Company of Canada Limited, recently received the honorary degree of Doctor of Laws at the University of Alberta in Edmonton. Mr. Jewitt joined Cominco in 1927 as an exploration engineer.

E. J. CRAIG has resigned his position as resident engineer for Pluton Uranium Mines, Ltd. at Uranium City, Saskatchewan, Canada, and is now in El Bagre, Colombia where he is assistant engineer for Pato Consolidated Gold Mines, Ltd. Pato is the largest gold producer in the country and operates connected bucketline dredges at Zaragoza, Antioquia.

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Bethal District In Union of South Africa Promises To Be Scene of Great U_3O_8 Activity

The Bethal district in Transvaal, Union of South Africa, continues to be the scene of expanding exploration operations. It is reported that in this district encouraging uranium values have been found in the Kimberley Reef which on the Far East Rand of the Witwatersrand, to the west, is the main uranium-bearing reef. While in most areas of the Union, uranium is recovered as a by-product of gold, here gold may well be recovered as a by-product of uranium at some future time.

The area now under option in the Bethal district roughly extends over about 300,000 morgen or 432,000 claims. Major option holders are Union Corporation Ltd., Anglo American Corporation of South Africa Ltd., Central Mining/Rand Mines Ltd. (the Corner House group), Anglo-Transvaal Consolidated Investment Company Ltd., New Consolidated Gold Fields Ltd., General Mining and Finance Corporation Ltd., and Rio Tinto Company Ltd. The main sub-participants are Anglo-Rand Mining and Finance Corporation Ltd., New Union Goldfields Ltd., and Capital Investments Ltd.

The Rio Tinto block is located in the western section south of Kendal. (See the accompanying map.) The extensive Union Corporation holdings follow on southward from the Rio Tinto group to Leslie and then extend eastward on each side of the railroad to Davel. The Anglo American holdings lie immediately north of Trichardt and the Union Corporation holdings there, and run eastward and northeastward near Carolina, embracing Hendrina. East of the Anglo American holdings, near Carolina, is another major block that includes the town of Carolina and the area immediately east of the town; this block is under option to an unidentified mining firm believed to be the Strathmore group.

More to the south and to the north and northeast of Davel is an extensive area under option to the Corner House group, which also has under option a block at Amsterdam, further southeast. South of Bethal and of the Union Corporation holdings there, and between these and the Anglo-Transvaal holdings at Morgenzon, is the General Mining Block of holdings. Immediately east of these and just south of the Union Corporation group near Davel is the New Consolidated block. South of the General Mining and New Consolidated holdings is the area under option to Anglo-Transvaal extending north and south of Morgenzon and to the east and west of that point.

A geophysical and gravimetric survey has been carried out over most of the area under option, while an intensive drilling program by Union Corporation has been in progress for some time. This firm has already completed more than 40 boreholes, mostly in a zone of about 28,000 morgen or 40,320 claims between Kinross and Trichardt.

Russia Enters World Metal Market to Pay For Imports

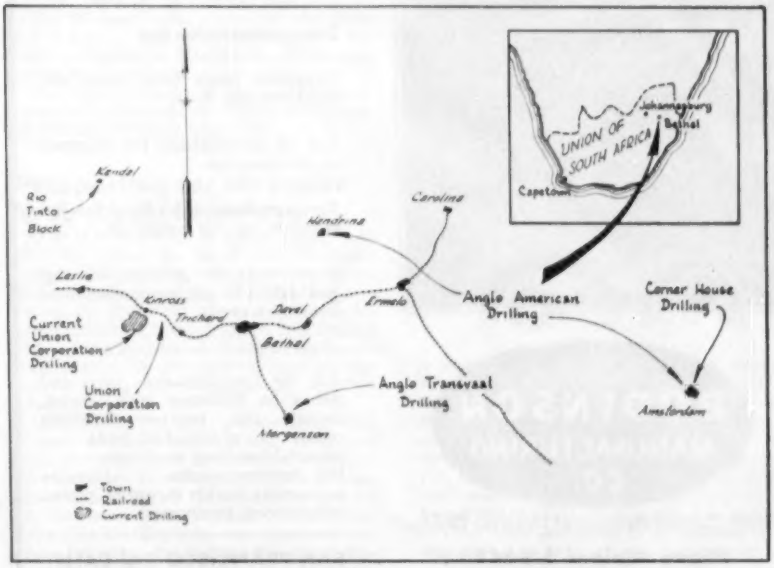
Russia has started selling gold, platinum, manganese, chromium, and silver in the world market in an effort to pay for increased imports of consumer goods. Since the death of Stalin, a definite policy of increasing sales of metals and minerals to western countries appears to be emerging.

London bullion dealers are reporting sales of Russian gold on the Continental markets of Paris, Amsterdam, and Tangier. A spokesman of the Soviet-Japanese Trade Promotion Council is reported to have said that Russia has offered to sell 20,000 tons of manganese ore and 20,000 tons of chromite to Japan.

About 2,000 tons of Soviet manganese ore recently arrived at Boulogne, France. The import was made under the Franco-Soviet trade agreement and was the first shipment of manganese ore from Russia to France since the end of World War II.

In the United States reports say that Russia is attempting to sell chromium and manganese ores although, as yet, no buyers have been found. After nearly three years of a "cold war" embargo, observers feel that Russia, in trying to keep its promises to its people to supply more goods for domestic consumption, is selling its minerals to buy consumer goods.

The changing economic picture is of particular interest to MINING WORLD readers in light of the Forecast made in the October 1953 issue (page 42) that a Russian Trade Offensive might be designed to slow Free World mineral production.



Place-fix map of Bethal uranium-gold district.

UN Tin Group Recommends Stabilization Measures

An agreement which attempts to stabilize market and production conditions for the tin industry was drawn up by representatives to the United Nations Tin Conference at the final meeting in Geneva, Switzerland in December.

The conference was originally called in 1950 to "discuss measures designed to meet the special difficulties which exist or are expected to arise concerning tin and, if desirable, to conclude an international commodity agreement." The second session, held in November and December, 1953, considered a draft of this agreement, prepared by a committee of the International Tin Study Group.

The agreement recommends the establishment of a buffer stock and the acquisition of 25,000 tons of tin metal to be contributed by producing countries. It also provides for the setting up of export controls when the buffer stock has absorbed a minimum of 10,000 tons and when such controls are warranted by market conditions.

As an initial basis for operation, the agreement would establish a floor price of £880. Operation of the buffer stock would be entrusted to a manager and would depend on the relation of the market price to the floor and ceiling prices.

To administer the agreement and to supervise its operations, an International Tin Council would be established in London.

The text of the agreement now goes to the governments represented for their consideration. It will be open for signature from March 1 to June 30, 1954. The governments will signify their approval by signature and ratification through constitutional processes. As soon as nine countries, holding one-third of the votes provided for consuming countries represented at the conference, and by countries holding 90 percent of the votes for producing countries represented, a meeting will be held to decide the date the agreement will enter into force.

Burmese Government To Be Partner In Mining Firms

The Burma government states that at present it does not intend to nationalize mines within the country, but will participate in the mining industry as a partner. The government has formed and controlled the mineral Resources Development Corporation, and has allotted $2,100,000 for the firm.

Representatives of the 10 foreign companies (four dredging, three mining, and three prospecting syndicates) were recently called to a conference in Rangoon

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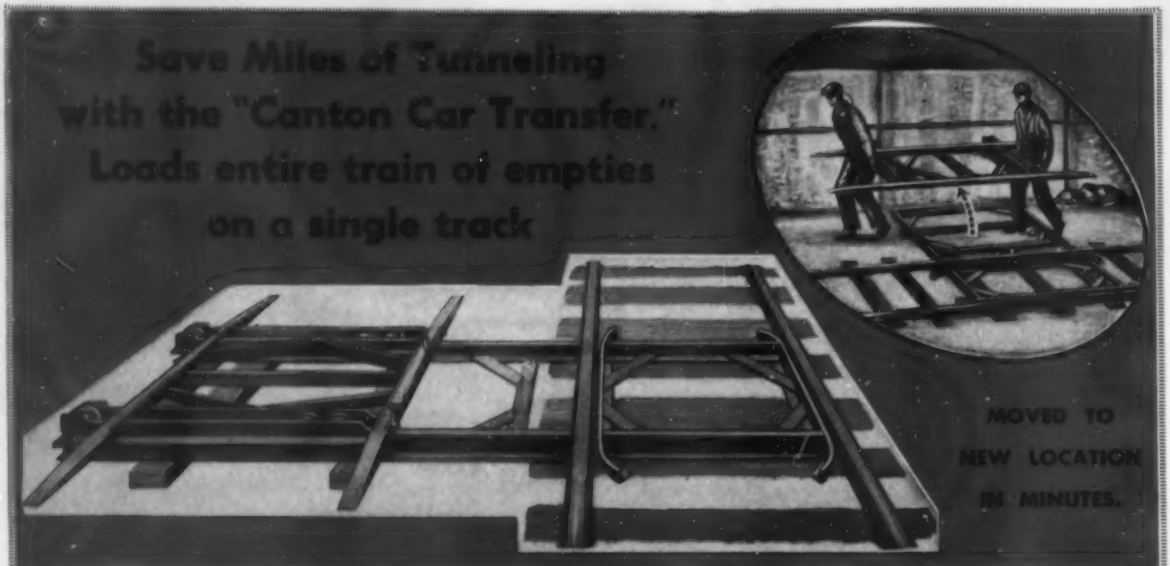

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to meet the government's representatives. At this meeting, the government stated that it would participate as partners with the companies, taking from one-third to one-half interest. The companies would continue to operate the mines but with government representatives added to the directorate. Meanwhile, no new mining leases would be issued to the companies, and when the present leases expire they will not be renewed.

The companies have been asked to submit reports of their physical assets. They have done so but further action has been delayed because of changes of officials in the Mining Department of the government's Mining Organization.

Japan Plans Increase In Titanium Output For 54-55

Japan's production of titanium for the next fiscal year will be about 1,330 tons, more than eight times more than that estimated for the 1953 fiscal year, according to a spokesman for the Titanium Association. The estimate exceeds a target of 1,200 tons planned for the first year of a five-year government project.

Three of the major titanium manufacturing companies are planning to increase production from May, October, and December, respectively. Two of the six companies will still be in a stage of trial production. In reaching the goal of 1,330 tons, the companies will need 87,880,000 KWA of electric power.

Lead Prospecting Nears Standstill in Greenland

Lead prospecting in Greenland which is being carried on by Danish, Swedish, and Canadian companies is almost at a standstill because of a shortage of capital, according to a report in the Danish government's "Social Democrat" newspaper. The newspaper said that the Scandinavian Mineral Society, doing the prospecting, will ask the government for a subsidy of 12,000,000 kroner ($1,770,000) and a guarantee of another 12,000,000 kroner. Most of the original capital ($2,210,000) has been spent in the time (over a year) that mine development has been underway at Mestersvik, on the east coast of Greenland.

For more details of prospecting activities in Greenland, see March 1953 issue of MINING WORLD, page 59.

Prospecting for Tin Under Way Again In Malaya

For the first time in many years, several tin areas in Perak and Selangor states, Malaya have been opened to prospecting with armed guard protection provided by the state governments. Under construction in Sungei Manik is a central camp for members of the security forces and parties of prospectors, and similar arrangements are being made in other places.

Ulu Klang Tin Ltd. will prospect over a part of the Sungei Manik area, and arrangements have been made with Anglo-Malayan Development Ltd. to undertake drilling of its adjoining ground at the same time. If the area contains mineable tin deposits, consideration will then be given to finding the most economical methods of mining the property.

Kilembe Copper-Cobalt Financing Now Assured

Kilembe Copper Ltd. in Uganda, Africa, will be brought into production under an agreement recently negotiated by Frobisher Limited, Colonial Development Corporation, and Uganda Development Corporation. Erection of processing plants at Jinja and Kilembe will be started at once to handle some 40,000 tons of ore per month, from which 18,000,000 pounds of copper and 900,000 pounds of cobalt will be recovered annually.

Frobisher, a subsidiary of Ventures Limited, has already spent about $3,600,000 on development of the Kilembe mine, and it is estimated that another $12,600.000 is needed to bring the mine into full production by 1956. Colonial Development and Uganda Development between them will provide $7,000.000, and Frobisher will arrange for the rest.

Thus far, Frobisher has reopened many of the old workings, engaged in surface work, mapping, underground development, and diamond drilling at the mine which is near the Ruwenzori Mountain range. At least seven ore deposits are known. Ore is estimated at 10,791,000 tons indicated, averaging 2.09 percent copper and 0.18 percent cobalt, plus 3,964,000 tons of inferred ore averaging 1.44 percent copper and 0.19 percent cobalt.

The cobalt concentrate will be processed at Kilembe and cobalt oxide shipped probably to Canada for refining. Copper concentrate will be roasted at Kilembe, and railed to Jinja where an electric smelter will produce blister copper.

The Macalder-Nyanza mine in Kenya, in which Colonial Development has controlling interest, will have a part in the arrangements. Copper precipitates from that mine will be treated in Kilembe's Jinja smelter. This means that Macalder may be brought into production sooner, with a rate of 10,000 tons of ore per month being considered at present.

A new railway will be built from Kampala to Kasese to serve the mine. Power for the Jinja smelter will be provided by a new £22,000,000 hydroelectric project at Owen Falls, scheduled for operation this April.

Texas Sulphur Firm Plans Baja California Plant

Texas International Sulphur Company will erect a plant for extraction of crude sulphur, using the autoclave process, near San Felipe, Baja California, Mexico. The Navarro concessions and the newly acquired mining rights to adjoining concessions will provide the sulphur for processing.

Sulphur deposits have been known to exist in the San Felipe area, 125 miles south of the border, for about 40 years, but until now no practical processing and marketing facilities have been established. New transportation facilities, together with the new processing plant, have now made the deposits of commercial value.

Design of the plant is under the direction of J. Harry Pollard of Houston, Texas, consulting engineer for the company. He will also supervise the plant's construction and operation.

Texas International Sulphur Company was formed in February 1953 by Tom Kramer and M.A.S. Makris of Houston, and Mexican associates. Victor Dykes, formerly vice president of Texas Fund, Inc., is president of the new firm.

Peruvian Mill at 15,800-Foot Elevation

A new concentration mill and Diesel power plant have been placed in operation by Volcan Mines Ltd. at its property near Ticlio, high in the Peruvian Andes of South America. Located more than 15,800 feet above sea level, the installation is an engineering feat and one of the most modern in Peru. The picture above shows the power plant, crushed ore storage bins, and the mill behind the bins. The mill processes 400 to 450 tons of lead-zinc-copper-silver ore per day, with four Caterpillar D397 Diesel-electric sets generating a total output of 750 kilowatts on continuous operation, which is considered satisfactory at this high altitude. The mine has been worked intermittently since around the early 1500's. With the aid of United States funds, it was placed in production again in 1944 as a lead-zinc producer. Ore reserves were considered to be sufficient to warrant construction of a concentration plant. This was started in 1951 when a contract was signed with the U.S. Defense Materials Procurement Agency calling for the purchase of slab zinc by the United States.

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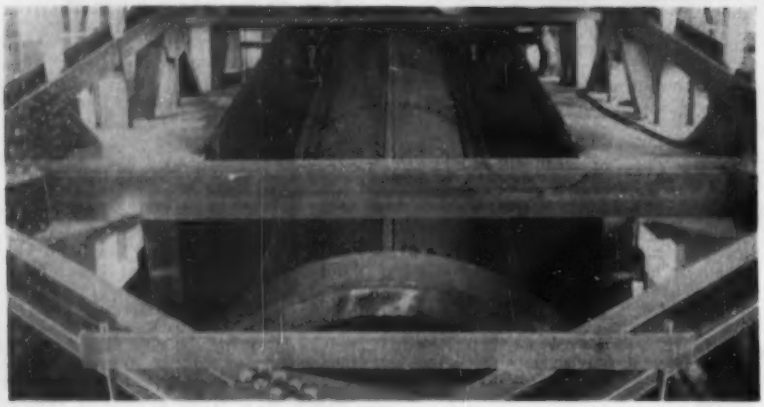

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INTERNATIONAL

CHILE—Figuring in recent negotiations between the Chilean government and United States copper companies has been the development of two important copper ore deposits owned by *Santiago Copper Mining Company*, a subsidiary of *Anaconda Copper Mining Company*. Recent surveys of the properties indicated 8,000,000 tons of ore which could be mined and milled to yield 30,000 to 40,000 tons of blister copper annually. Installation of a new smelter and electrolytic refinery near Santiago are considered possibilities. Because of these developments, the government is reported to be considering submission of a bill to Congress which would provide for a new copper policy and take steps toward increasing production.

CUBA—The United States Office of Defense Mobilization is currently considering proposals of *Freeport Sulphur Company* and the *Nicaro* nickel plant to increase production facilities in Cuba by about 38,000 tons annually. Freeport's expansion is at Moa Bay and would produce about 30,000,000 pounds of nickel a year. The Nicaro expansion would be by about 75 percent. ODM is also considering proposals of the General Services Administration to increase the nickel program.

PERU—*Kennecott Copper Corporation* maintains an exploration office in Lima for the purpose of investigating undeveloped nonferrous mineral resources in the country and elsewhere in South America. Robert D. Ferron is manager with a staff of five geologists in the field.

BRAZIL—*Companhia Ferro e Aco de Vitoria* has signed a contract with the German *Kloeckner* iron and steel group for the installation of a 50,000-ton-per-year steel plant in Vitoria, capital of Espirito Santo state. The plant will be expanded in subsequent stages until it reaches a capacity of 400,000 tons per year. Operation is scheduled for January 1955.

VENEZUELA—The *Venezuelan Sulphur Corporation* may undertake development of the newly located sulphur deposits near Puerto Piritu in the state of Anzoategui. The firm had been planning to mine at El Pilar in cooperation with French interests at a rate of 250,000 tons yearly. However, this may be abandoned in favor of the other deposit.

MEXICO—Mining production in 1953 was much lower in volume and sales value than the 1952 level, based on results during the first eight months of 1953, the Ministry of Finance announced. Sales value was $161,160,000 during the January to August period, compared with $200,110,000 in the same period of 1952. Silver, lead, copper, and zinc sales yielded only $90,900,000 in the 1953 period, compared with $127,900,000 in 1952.

CHILE—The German firm of *Nord Deutsche Affinerie Hamburg* has concluded a two-year contract with medium- and small-sized Chilean copper producers for the sale of 20,000 tons annually. The price is to be based on the world market level.

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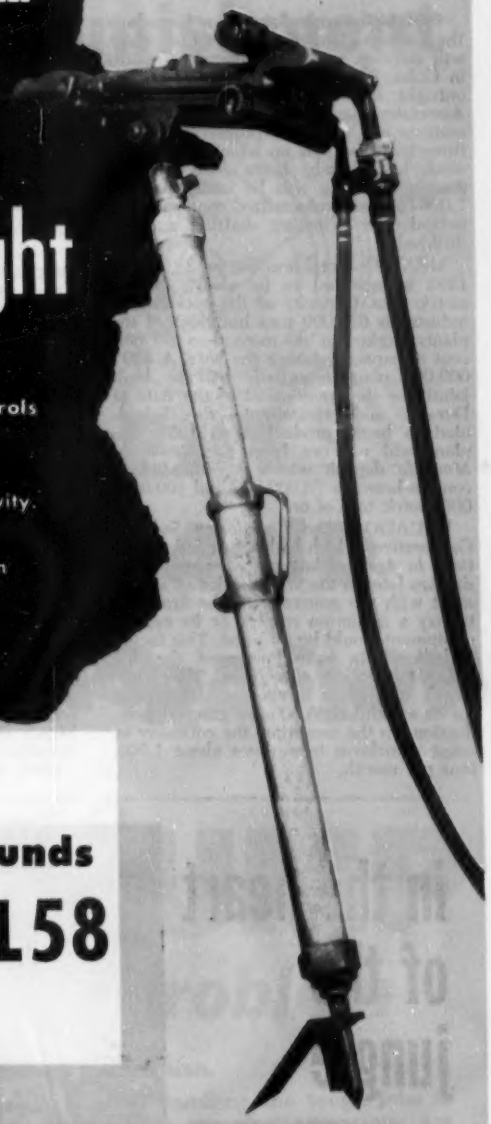

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CUBA—Recently formed in Canada is the *Canuba Manganese Mines Ltd.* which will develop proven manganese deposits in Cuba. The new firm will also control outright the Cuban company, *Havana Associates, Inc.*, which will handle all operations in Cuba. The properties include three large sections on which exploratory work has already been done. Further diamond drilling will be undertaken. A 7,000-foot-long mineralized zone has been indicated by trenching, shafting, and one drill hole.

MEXICO—Total iron ore production in 1953 is expected to be about 450,000 metric tons. Capacity of the nationalized industry is 625,000 tons but most of the plants worked at no more than 60 percent of capacity during the year. A $40,000,000 plant reportedly will be built jointly by the government of the state of Durango and private enterprise. Scheduled to begin production in 1955, the plant will use ore from the *Cerro de Mercado* deposit which is estimated to contain between 73,000,000 and 100,000,000 metric tons of ore.

ECUADOR—The *Ecuadorian Sulphur Corporation*, which had suspended operations in April of last year, resumed production later in the year. Under an agreement with the government, the firm had to pay a minimum royalty or its capital equipment would be forfeited. This factor is believed to have influenced the decision to resume operations. The company's new plant is not yet satisfactory for its scheduled 36,000-ton-per-year production. In the meantime the company is using autoclaves to produce about 1,000 tons per month.

BRITISH GUIANA—*Kennametal International*, South American subsidiary of *Kennemetal Inc.*, is reported to have abandoned exploration work in British Guiana after 10 months of operation. The firm had been seeking columbite-tantalite.

BOLIVIA—Bolivian tin, lead and tungsten will be shipped to Austria under a one-year trade agreement. Austria will supply, in return, glass, chemicals, and machinery.

MEXICO—The Ministry of Finance is emphasizing that small-scale miners may freely and directly obtain subsidies of up to 75 percent in the form of production and export tax kickbacks by themselves and without any paid aid, particularly to go-betweens. The presidential decree granting these subsidies provides for payments directly to the beneficiaries and go-betweens are useless—paying them high commissions is a waste of money.

SIERRA LEONE—The Geological Survey Department will receive a £68,039 grant under the Colonial Development and Welfare Act to meet expenses until March 1956. For the past five years, the department had been financed by the United Kingdom. The department will undertake geological mapping of the country. Some areas, such as parts of the Kangari Hills, have already been mapped. The new program will complete mapping of the Kangari Hills area, probably by the end of this year, and provide plans to map the schist belt of the Kambui Hills and the Gori Hills in 1955, and the schist belt of the Nimini Hills in 1956. A diamond drill will be purchased for the program.

UNION OF SOUTH AFRICA—The world's largest gold producer, *Blyvooruitzicht Gold Mining Company, Ltd.*, reports a decline in its working profits for the year ended June 30 by £1,333,000 to £6,362,500. This was attributed to reduced tonnage milled, lower yield, lower gold sales premium, and increased working costs. The serious Native labor shortage, common to the entire gold mining industry, was the cause of the lower tonnage milled and the higher working costs. However, the company was able to develop sufficient ore to maintain the available ore reserve at about the same tonnage as at June 30, 1952. Sinking the sub-incline shafts to open up the deeper levels of the mine was retarded by water control problems. These may cause further delays and, accordingly, additional reef winzes have been started from the present bottom levels of the mine to expedite lateral development. The company is advancing twin haulages from both No. 1 and 2 shafts to the positions of the proposed sub-vertical shafts. Sinking of the No. 1 sub-vertical will be started first and so work has been concentrated mainly on the haulages south from the No. 1 shaft. The uranium extraction plant should be operating at full capacity now.

MOROCCO—An aerial tramway was installed last October to transport manganese from the mines located in the region of Ouarzazate (South Morocco). Near Ouarzazate are the most important manganese deposits in North Africa: *Imini* and *Ti Ouine*. The tramway is 29 kilometers long. Its starting point is at Aguelmous (altitude: 2,038 meters) on the south side of the High Atlas mountain range, and its terminus is at Talatast (altitude: 993 meters) on the north side near Marrakech. The tramway spans the High Atlas at 2,406 meters. It can transport 50 tons per hour.

ALGERIA—The first eight months of 1953 were noteworthy because of the sizeable increases in production of antimony ore (4,370 tons compared with 2,310 in the first eight months of 1952), lead ore (7,420 tons compared with 4,020), zinc ore (21,290 tons compared with 16,050), and diatomaceuous earth (18,260 tons compared with 16,300). Production of iron ore remained about the same (2,191,440 tons compared with 2,073,750). Pyrite production showed a decrease (17,220 tons compared with 20,080), with the decline especially noticeable in phosphate (406,980 tons, compared with 504,120).

UNION OF SOUTH AFRICA—*Kennecott Copper Corporation* of New York is reported to be providing funds (£5,000,000) for *Merriespruit (Orange Free State) Gold Mining Company* to help the latter reach the production stage with a milling rate of 75,000 tons per month. Interest of 3.0 percent per year will start at the beginning of production. Kennecott will have an option until the end of 1958 to convert part of the loan stock into ordinary stock.

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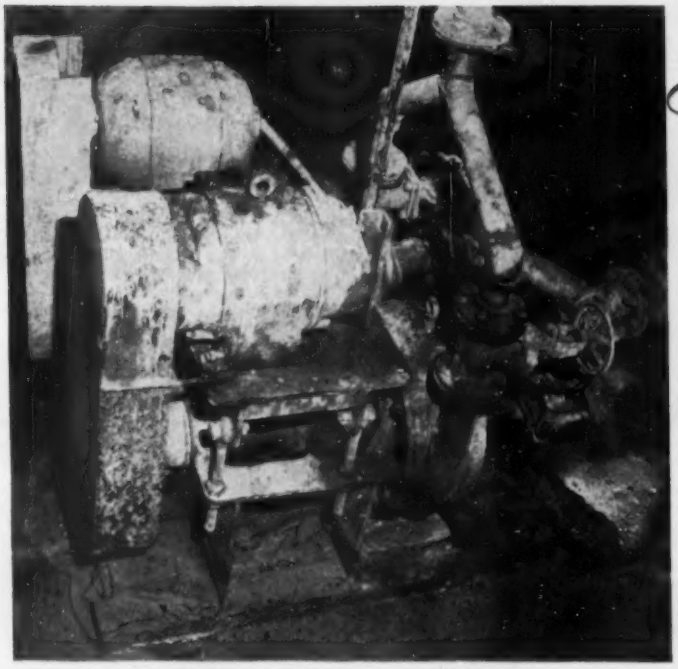

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SOUTHERN RHODESIA—*Consolidated Rand Brick Pottery & Lime Company* of Olifontsfontein (South Africa) has started exploratory and development work on the *O'Brians* prospect mine, a massive corundum deposit at Concession, near Salisbury. The ore zones are now being diamond drilled and a small production for the requirements of the Olifontsfontein Works has been started.

FRENCH MOROCCO—Mining output during the first nine months of 1953 increased somewhat over the same period of 1952 as follows: copper ore 3,060 tons compared with 2,080; ore containing chemical grade manganese 39,900 tons compared with 28,030; zinc ore 48,620 compared with 37,410. Remaining at about the same rate were: iron ore 418,770 tons compared with 484,500 tons; ore containing metallurgical grade manganese 293,730 tons compared with 296,240. Production of lead ore dropped from 85,290 in the first nine months of 1952 to 81,000 tons in 1953; antimony ore dropped from 1,230 tons to 72 tons; barium from 2,500 tons to 50 tons; beryl from 107 tons to 17 tons; and cobalt ore from 7,690 tons to 4,690 tons.

BELGIAN CONGO—The new electrolytic zinc plant of *Metalkat*, a subsidiary of *Union Miniere du Haut Katanga*, is in operation producing 10 tons of zinc per hour. It will treat concentrates from the *Kipushi* copper-zinc mine whose ore also contains notable quantities of germanium. Two smaller zinc deposits are known in Katanga and they were drilled in 1953.

UNION OF SOUTH AFRICA—The *Luipaards Vlei Gold Mining Company* expects that its uranium leaching plant will be in operation by mid-1954. The Turk Shaft gold reduction plant extensions have been completed. When uranium production begins, three units of the reduction plant will be set aside for the separate treatment of Bird Reef ore—the main uranium carrier in the area—and the slimes from these units will be pumped to the uranium plant for final treatment.

TUNIS—During the first nine months of 1953, production of lead ore was 28,380 tons, compared with 26,680 tons during the same period in 1952. Production of iron ore was 804,600 tons, compared with 740,520 tons. Output of zinc ore decreased during that period from 5,810 tons in 1952 to 4,730 tons in 1953, and phosphate production dropped from 1,710,210 tons to 1,328,100 tons.

SOUTHERN RHODESIA—*Turner & Newall Ltd.*, are acquiring a controlling interest in *Porter's Cement Industries (Rhodesia) Ltd.*, which company manufactures asbestos cement products in both Rhodesias. The Turner & Newall group operates, through subsidiary companies, *The African Asbestos Mining Co. Ltd.*, and the *Rhodesian & General Asbestos Corp., Ltd.*, Rhodesia's largest chrysotile asbestos mines, including the *Shabanie, Nil Desperandum, Kings, Grath's* and *Croft* mines. The fiber produced by the group will now be in part used and processed into asbestos cement products in Porter's Cement Industries.

NYASALAND—The *London Tin Corporation* has formed a new company to prospect for minerals in Nyasaland. The firm has been registered as *London Nyasaland Mining Corporation Ltd.* Current geological reports have indicated min-

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BLAST DATA:

Number of holes	11
Average depth	91′
Height of face	85′
Spacing	14′
Burden	27′
Rockmaster delays	1 to 6
Total explosives (Apex #2 LV and #4 HV)	11,400 lb.
Rock produced	34,170 Tons
Powder factor	3
Loading started	7:15 AM
Loading finished	10:15 AM
Blast fired	11:15 AM

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eralization in certain areas but it is too early to determine whether they can be worked economically.

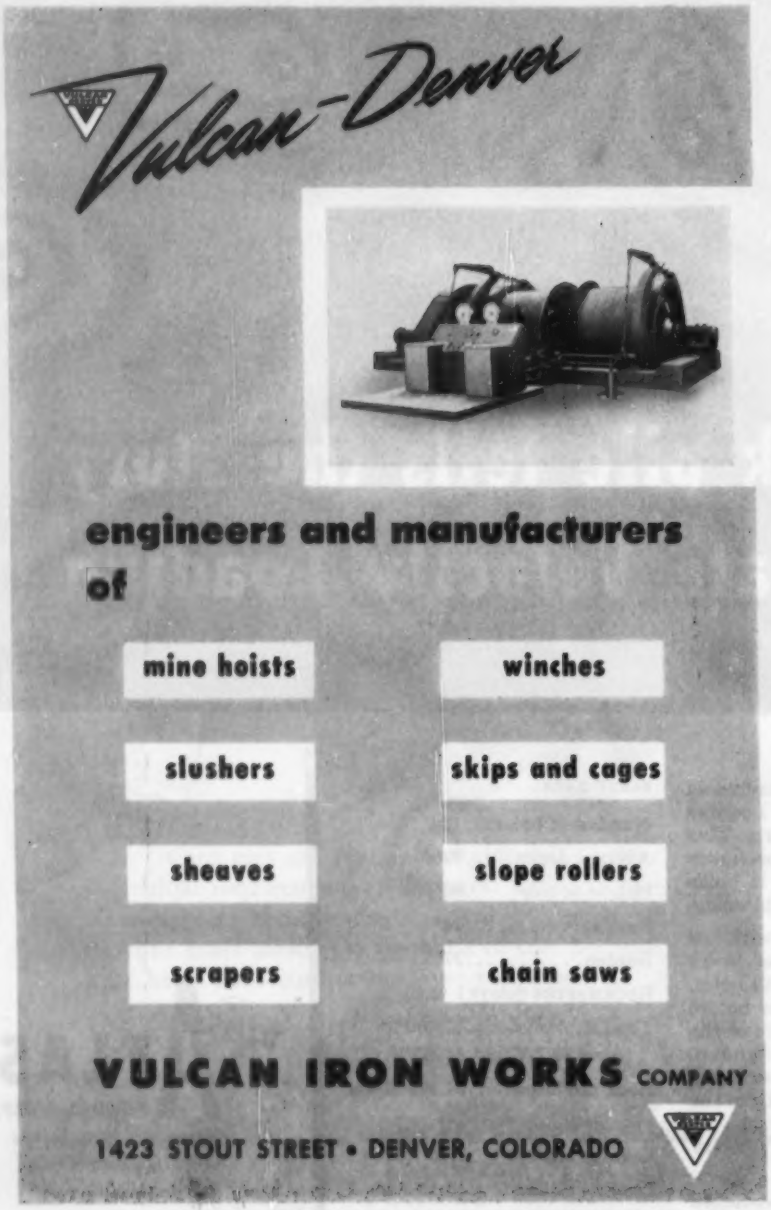
SOUTHERN RHODESIA—*Sabi Mining & Exploration Co. Ltd.* has been granted an exclusive prospecting reservation of 99 square miles in the lower Sabi Valley area for three years. The company plans to spend a minimum of £20,000 during this time in exploration for iron ore and coal deposits.

MOZAMBIQUE—*Empreza Mineira de Alto Ligonha Lda.* has started large-scale production of lepidolite ore (lithium) from the quarries at Nahipa and a few other large pegmatite dikes in the company's 5,000-square kilometer concession. Difficulties are being encountered in keeping the ore up to grade, i.e. three percent Li_2O, because of adhering albite. Beryl and columbite are recovered as by-products. The company also produces considerable quantities of columbite from eluvial washings at Muianne.

NIGERIA—*Keffi Tin Company, Ltd.*, a wholly owned subsidiary of *Amalgamated Tin Mines of Nigeria, Ltd.*, has located through a geological survey considerable quantities of columbite in the biotite granite underlying some of the areas of the plateau. It has been decided that mining and recovery of this columbite, necessitating new methods and a special plant, will be kept entirely separate from tin mining conducted by Keffi and any lease which is found to contain columbite principally will be worked by that company. The Keffi company's tin properties have been transferred to *London Nigerian Mines Ltd.* The proved columbite reserves in the biotite granite which can be economically mined at the current price are presently estimated at about 15,000 tons.

SOUTH AFRICA—While continuing the restriction of sales of nonmonetary gold to 40 percent of new production, the South African Treasury has relaxed restrictions on processed and semi-processed gold which formerly had to be of 22 carats. The sale of fine gold bullion bars is now permitted, through approved agencies, to any part of the world.

SOUTHERN RHODESIA—*American Potash & Chemical Corporation* of Los Angeles, California, has completed arrangements with *Bikita Minerals (Private) Ltd.* for the handling of lepidolite and petalite ore mined from a large high-grade lithium-bearing deposit near Fort Victoria, Southern Rhodesia. The property is owned and operated by Bikita, under the management of *Selection Trust Ltd.* American Potash and the *American Metal Company Ltd.* are associated with Selection Trust in financing and developing the project.



MALAYA—An additional 10-year life has been predicted for *Petaling Tin Limited's* No. 6 dredge following purchase of 600 acres of tin-bearing land for £200,000. The gravel reserves presently being worked by the dredge are expected to last until 1963, and the newly acquired area will be worked after this. Approximately 50,000,000 cubic yards are contained in the new section, averaging 0.34 kati per cubic yard (1 kati is equal to 0.52 pounds). Before the land is dredged, the previous owners, *Castlefield (Klang) Rubber Estate, Ltd.*, will be entitled to rubber tapping rights which will expire at the end of 1962.

THAILAND—The government has issued an import restriction act which ends free importation of mining machinery. Applications for importing of mining equipment must be submitted to the government for consideration before supplies from abroad may be ordered.

BURMA—Lead-zinc ore production at *Burma Mines Ltd.* has risen steadily during the last fiscal year. Quarterly totals were: 2,088 tons, 7,817 tons, 9,991 tons and 12,218 tons, the latter being for the quarter ended June 30, 1953. The number of underground workers increased slightly during the year and the new labor force is now settling down and beginning to show increasing efficiency. Reconditioning of No. 4 generator (4,000 kw) at Mansam Falls hydroelectric generating station continued to be satisfactory during the year.

ISRAEL—*Compagnie Belgo-Continentale* of Brussels, Belgium is developing the *Negev* copper mine at Wadi-Timna. 200 tons of copper ore will be treated in Germany in a plant erected there by the company.

MALAYA—An unknown vein has been exposed in the Myah main lode series of

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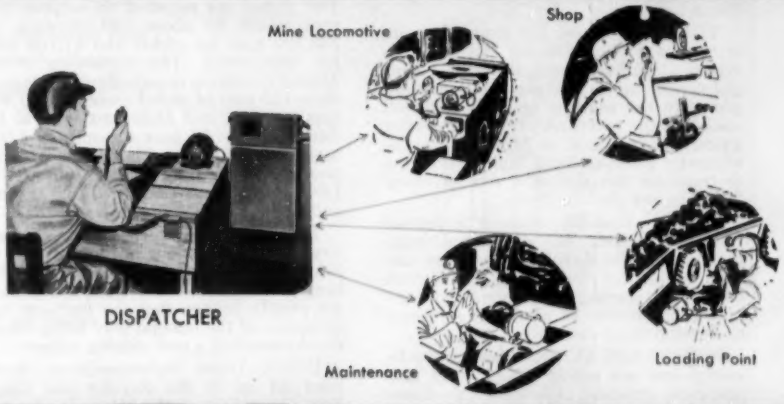

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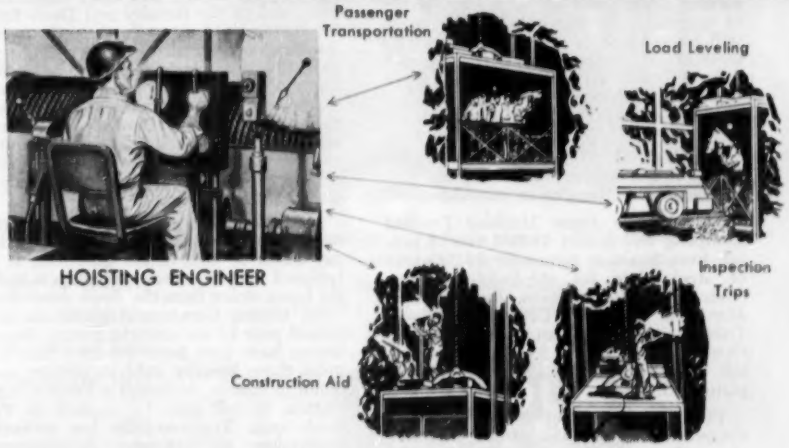

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the *Myah* tin mine operated by *Pahang Consolidated Company Ltd.* So far the ore is considered to be of good grade and shows some promise of persisting in depth. Development on the 1,200-foot level of the *Willinks* mine was suspended while the new shaft in the Myah was being sunk to the 1,300 level. Crosscutting towards the lode is now being carried out on the 1,300 level. Following the satisfactory results which have been obtained by diamond drilling in the Myah main lode below the No. 11 level, the exploration program is now being extended to the Gakak Creek.

JAPAN—The *Nozaki Sangyo Trading Company* has signed a $60,000 contract with a New Caledonia mining firm for the importing of 7,000 tons of nickel ore. New Caledonia's 6.0 percent nickel ore is considered to be easier to refine than Japan's.

TURKEY—*Etibank* has awarded a contract to a French firm for the construction of a sulphuric acid plant at the *Murgul* copper mine. The plant will be completed in the summer of 1955, and will use all of the reverberatory and converter gases. Also planned at Murgul is a 23-kilometer tramway from Murgul to Hopa to transport the acid at a rate of about 200 tons per day.

BURMA—The Government Industrial Research Mission has discovered magnetic iron ore in abundance in Tavoy district in the rich tin-bearing Tennasarim belt. The Burma government contemplates the erection of a smelter at Tavoy to develop these resources.

PORTUGESE INDIA—The first mechanized iron ore mines at Goa went into operation recently. *Chowgule & Company Ltd.* controls the project. Maximum production of 2,000 tons per day is expected shortly. The mine is located close to the river and 25 miles from the harbor of Marmogoa. Transportation will be by barges (19) with a total capacity of 2,500 tons. This will later be increased to 6,500 tons.

MALAYA—At its annual meeting, *Lukut Tin Dredging Ltd.* reported that much of the construction and assembly of its dredge was carried out by its associated company, *Jelebu Tin Dredging Ltd.* Close drilling has been carried out in the immediate vicinity of the site of initial operations and as dredging progresses, further drilling will be carried out ahead of operations so that only payable areas will be worked. It is expected that this method of dredging on the company's present leases will have a life of about five years. However, the firm is considering the addition of other leases in the area.

THAILAND—The pontoon for dredge no. 2 of *Kamunting Tin Dredging Ltd.* was floated at Bangtoe in November.

JAPAN—The *Japan Machine Trading Company* will import 18,000 tons of potash from Spain in return for $7,080 tons of steel plate for shipbuilding. Four other companies—*Daiichi Bussan K..K, Marubeni Trading Company, Nissho Trading Company,* and *Fuji Trading Company*—will import 24,000 tons of potash in return for 10,458 tons of steel plate to Spain.

TURKEY—A sulphur deposit has been discovered near Osmaniye in the province of Antakya.

THAILAND—The United States government has been conducting hearings concerned with irregularities in the fulfillment of tungsten contracts with Thailand mining firms. The Thailand producers holding contracts are *Mao Lama Mining Corporation, Yip In Tsoi Company Ltd., U. Tong Company,* and *Pradt Trade & Industry Company Ltd.* The contracts were issued in May 1951 in an attempt to build up these mines. The tungsten was to be purchased at $65.00 per long ton. When prices on the world market rose, deliveries of tungsten to the United States dropped; when the world price dropped, the deliveries increased at a rate far above the monthly rate specified in the contracts. The contracts were suspended pending further investigation of the situation.

JAPAN—Nickel producers have set production goals of 2,465 tons for nickel and 9,600 tons for ferro-nickel in 1954. The nickel ore required to achieve this goal would be about 249,900 tons, or 138,200 tons for nickel and 11,700 tons for ferro-nickel. The *Sumitomo Metal Mining Company* reportedly plans to produce 120 tons of nickel monthly or 1,440 tons per year, and *Shimura Chemical Industries* about 85 tons a month or 1,025 tons during the year. Ferronickel production will come from *Nihoj Mining* with 1,800 tons, *Nihon Yakin* with 5,800 tons, and *Kamogawa Kako* with 2,000 tons.

TURKEY—Scheelite has been encountered in many sections of the province of Edremit. Until now, scheelite has not been produced in Turkey, but many mining people believe that the frequent occurrences of the mineral may bring about development of a new mining industry.

INDIA—Three subcommittees have been set up by the Royalty and Dead Rent Committee of the Mineral Advisory Board of the Ministry of Natural Resources and Scientific Research to study the economic position of the more important mining industries, with particular reference to the advisability of raising the royalties levied by the state governments. The state governments, as the legal owners of underground mineral resources, levy royalties at a percentage of the value of the extracted mineral at the mine. Companies which have obtained mining concessions but which are not producing pay "dead rents." For some time, the state governments have been urging the central government to increase the existing rates of royalty and dead rents. The main task of the Royalty and Dead Rent Committee is to reconcile these divergent interests by rationalizing the existing rate structure and placing it on a scientific footing. The state governments represented on the committees are Orissa, Bihar, and Madhya Pradesh. The committees are for: coal, iron ore, chromite, and limestone; manganese, mica, and china clay; and gold, copper, lead, zinc, and kyanite.

MALAYA—The Federation government has taken steps to prevent the movement of gold to the guerrillas. It is believed that thousands of dollars in gold are being stolen from the *Raub Australian Gold Mining Company's* operations and turned over to the terrorist forces. Regulations have now been set up which require those keeping gold to register and obtain a license. Although a Federal regulation, it will only be applied in the Raub area. The company has recently undertaken an extensive development program and development footage is reported to be showing an appreciable increase.

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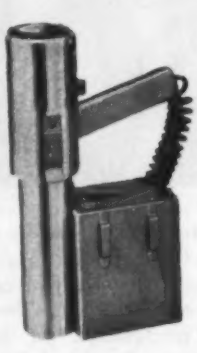

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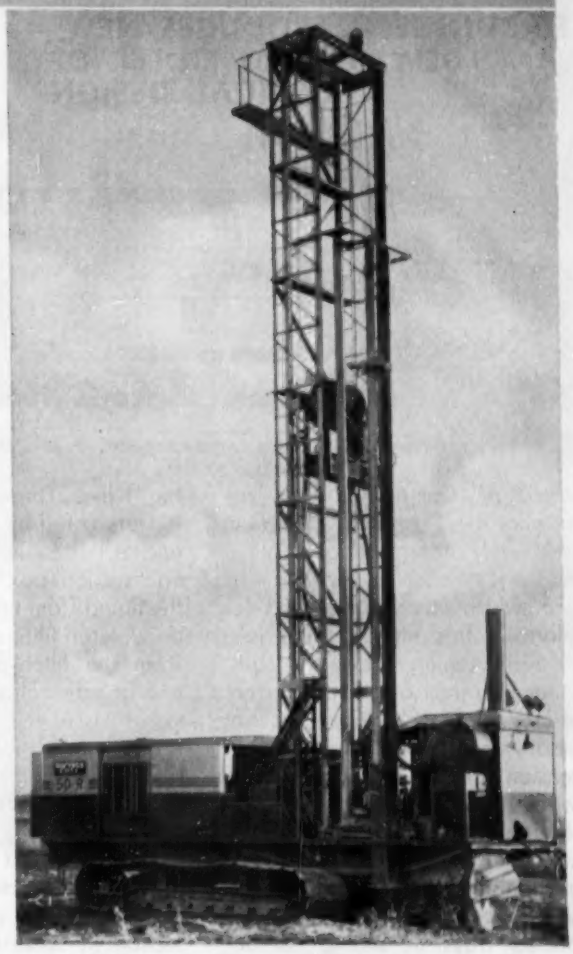

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BRITISH COLUMBIA—*Sheep Creek Gold Mines, Ltd.* is putting the finishing touches on its new mine camp at the *Mineral King* property in the Windermere district and has resumed development work. Machinery is being installed in a new 500-ton mill building. Other construction includes a power house, bunkhouse, five family dwelling units, a combination school house and community hall, an office building, and a three-rail surface tram to transport ore 500 feet from mine portal to mill. The lead-zinc property was taken over by the company in 1951. Henry E. Doelle of Nelson is managing director; J. S. McIntosh is in charge of mill construction; and F. R. Thompson is in charge of camp construction and mill operations.

ALASKA—Full-scale operations for the mining of scheelite may be started in the Nome area by *Erickson Placers, Inc.* during 1954. The company recently closed down operations for the winter season after several trenches were cut near Bangor, Butterfield, and Jarosa Creeks. Showings were reported to warrant full production. The jig method of testing was used for the first time in the Nome area. Walter A. Erickson of Anchorage is firm president.

ONTARIO—The LaRose cobalt mill of *Silver-Miller Mines Ltd.* has been expanded to handle 300 tons per day. Original capacity was 150 tons. Ore for the increased operation will come from the company's recently acquired *Lawson* mine where workings have been dewatered and rehabilitated. In the spring the firm plans to break through from the Lawson to the *University* mine where further tonnages of cobalt ore are available.

SASKATCHEWAN—A prospect shaft is being sunk by *Jahala Lake Uranium Mines* at its 20-claim *Nunn Lake* property in the La Ronge district to test a zone in which surface work and diamond drilling have indicated the presence of uranium. An 8- by 10-foot opening is being sunk at a 45° incline along a pegmatite-amphibolite contact where the uraninite mineralization is found. The company has also been carrying out prospecting and assessment work on a 17-claim group at Foster Lake.

BRITISH COLUMBIA—The firmer tone in world lead prices recently prompted *Yale Lead and Zinc Mines* to increase development work at its Ainsworth camp. Rehabilitation work at the *Krao* mine has been completed and a headframe built. Nearing completion is rehabilitation work on the McCune Tunnel. Production has been increased slightly.

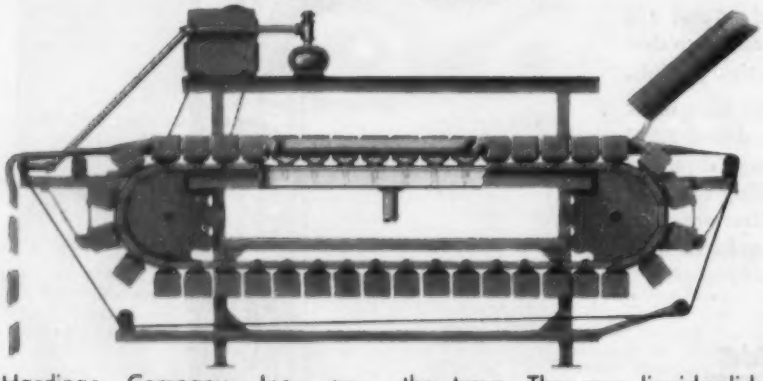
QUEBEC—*Quebec Nickel Corporation's* current surface drilling at the Gordon-Werner Lake property is confirming ore extensions to the 500-foot horizon in the area near the west end of Gordon Lake. The drill has since been moved easterly to the ice of Gordon Lake where this winter's program of deep drilling from the ice has started now. The three-compartment shaft has been sunk to the 40-foot horizon and the concrete collar has been poured.

ALASKA—Dredge No. 10 at Cripple Creek and dredge No. 5 at Eldorado have been closed down for the season by *United States Smelting, Refining and Mining Company* and repairs are being made on both. Dredge No. 6 at Gold Hill and dredge No. 2 at Fairbanks Creek were still in operation at the beginning of the winter season.

BRITISH COLUMBIA—Good lead-zinc-silver ore in widths up to 11 feet has been opened on the new bottom level of the *Estella Mines'* property in the East Kootenay district. The ore structure was reached by crosscutting after sinking 150 feet below the mine's main level. V. I. Nesbitt is consulting engineer.

QUEBEC—*Eastern Metals Corporation* is planning the erection of a 1,000-ton-per day nickel-copper concentrator at its property after metallurgical tests showed that the ore could be easily concentrated. A three-compartment shaft has been sunk to 490 feet with levels established at 170, 300, and 450 feet. Latest 170-foot level drilling has indicated further extension to the massive replacement type ore body in most southerly workings. Following completion of a flat hole to explore the south wall, the machine will be moved to the 450 level to drill a pilot hole from the west nickel drift before driving the cross-

HARDINGE INTRODUCES NEW DEWATERING FILTER OF RADICAL DESIGN



Hardinge Company, Inc., announces the "Tray Belt Filter"—a completely new type of continuous, liquid-solids separating device, which can be used: (1) for relatively fast filtering materials; (2) for washing grains or salts, either by direct or counter-current action; (3) for filtering solids not readily maintained in a fluid suspension prior to filtering, such as coarse sand or materials devoid of supporting slimes.

A simple, sturdy and inexpensive mechanism, the unit consists of a series of connected, traveling, perforated trays in sliding contact with a suction box beneath and supporting a filter cloth which moves with, but is not attached to the trays. The raw liquid-solids mixture is fed by gravity onto one end of this conveyor-like structure. The suction box rapidly removes the liquid from the feed, leaving a de-watered filter cake which drops from the filter at the discharge end at substantially the same elevation as at the feed end.

A washing action may be combined with filtration by use of water sprays above the filter cloth. A counter-current washing action can be obtained by means of a sectionalized suction box and re-use of the wash water from each section in successive sprays, approaching the feed end. Bulletin AH-450-3 describes the new filter in detail.

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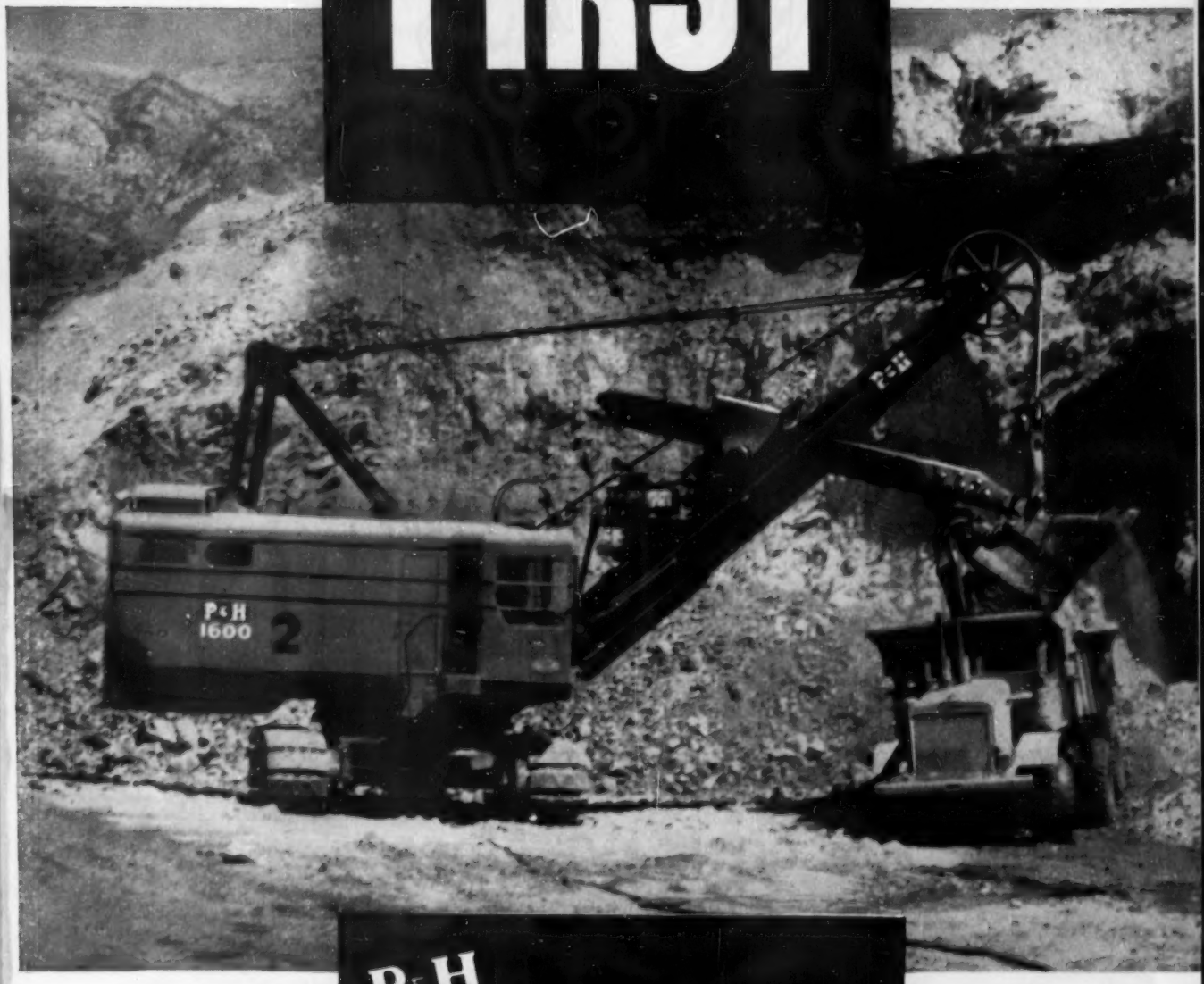

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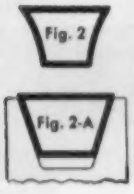
Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)



Instead of *bulging,* the precisely engineered CONCAVE SIDES merely *fill out* to *fit exactly* in the sheave groove (Fig. 2-A). The sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the Gates Vulco Rope—and this means *longer* belt life and *lower belt costs* for you!

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cut to explore for the downward projection of the No. 2 copper zone. The drill will be used later on the 170-foot level to drill from the No. 2 to the No. 1 copper zone.

BRITISH COLUMBIA—Production of gold for the first half of the current fiscal year, April 1 to September 30, 1953, amounted to 21,064 ounces from 49, 180 tons hoisted by *Pioneer Gold Mines of B.C. Limited*. Work on No. 5 shaft, sunk to develop four levels below 25 level on the 27 vein, has been completed and drifting on these new levels has started.

ALASKA—The *Mount Eielson* lead and zinc deposit formerly held by O. M. Grant and associates has been taken over by Harold Herning and Associates of Fairbanks. Located about 60 miles west of the railroad in McKinley Park, the deposit contains zinc-lead ore with zinc predominating. During next summer buildings will be constructed and open-cut prospecting will be undertaken.

QUEBEC—*Lake Asbestos of Quebec, Ltd.*, a subsidiary of *American Smelting and Refining Company*, is reported to be going ahead with plans to put the Black Lake properties of *United Asbestos Corporation* in production at a cost of between $15,000,000 and $20,000,000. Initial ore production is expected to be 5,000 tons daily, although the original agreement was for 4,000 tons. On an estimated annual production of 107,970 tons of asbestos fiber a year, the project would add about 11 percent to Canada's current production and about 17 percent to the dollar value of that production because of the high grade of the fiber. The Black Lake property was discovered in 1940.

ONTARIO—*Union Drawn Steel Company* of Hamilton, Ontario, Canadian subsidiary of *Republic Steel Corporation*, is reported to have acquired "one of the finest deposits of open hearth quality limestone ever found in the North American continent." The deposit is said to be located on 1,100 acres owned by the Canadian firm at Embro, northwest of London, Ontario. The limestone is chemically pure calcite and has a dense micro-crystalline structure which makes for ideal fluxing characteristics in steel furnaces.

ALASKA—*Goodnews Bay Mining Company* has completed its work for the season. In the McKinley Lake area, H. A. and E. R. Bowling of Anchorage plan to start development work on a gold quartz prospect during the coming season.

ONTARIO—Diamond drilling is under way on an optioned eight-claim nickel-copper prospect in the Sudbury area by *Bunker Hill Extension Mines Ltd.* An adit has already been driven on the property and from it some good copper and nickel samples have been obtained.

SASKATCHEWAN — *Jesko Uranium Mines* is arranging to acquire three uranium prospects in the Beaverlodge area and plans to start work on them as soon as negotiations are completed. One claim is in the St. Mary's Channel sector, another in the Charlot Lake sector, and the third in the LeBlanc sector. This will make six properties held by Jesko. Its two original Beaverlodge groups were the T. R. near the port of Bushell, and the Win north of Viking Lake where exploration work has been going on. A sixth group is in the Fort Chipewyan area, of northeastern Alberta.

BRITISH COLUMBIA—*Yankee Dundee Mines, Ltd.* is nearing the projected downward extension of the Yankee Girl vein in its Wildhorse Tunnel near Nelson. Work is on a two-shift basis and the tunnel is being advanced at a rate of about 250 feet monthly. Diamond drilling will follow the tunnel work. A. B. Goodrich is mine manager.

ONTARIO—*Conecho Mines Limited* has discovered a strongly radioactive showing of Peach-type conglomerate on its 35-claim property in the Quirke Lake sector of the new Algoma uranium camp, midway between Sudbury and Sault Ste. Marie. Diamond drilling will start as soon as equipment and crew are available.

ALASKA—Work has stopped for the winter at the *Wren, Waskey, and Wolff* cinnabar prospect at Aleknagik, just north of Dillingham. In the area near Seldovia where some new work is being done on chromite, Bill Lyons and associates plan to open-cut throughout the winter.

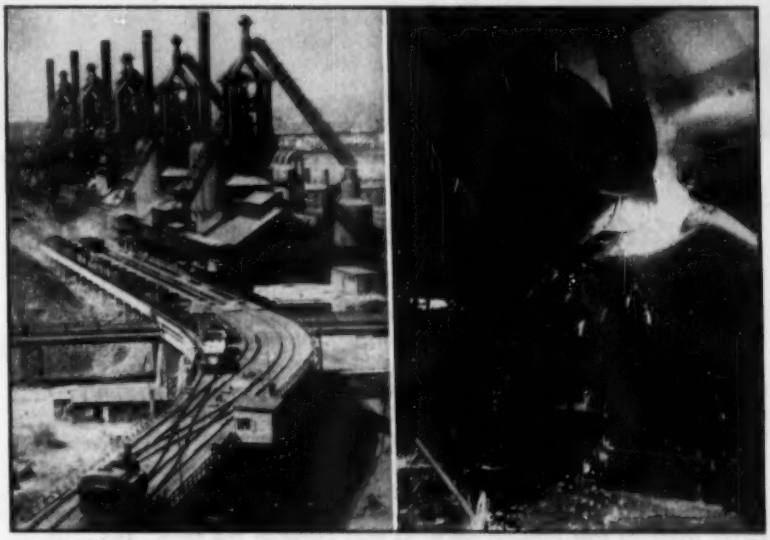
BRITISH COLUMBIA—Low prices for lead and zinc, coupled with higher freight and smelter charges, were blamed by *Base Metals Mining Corporation Ltd.* for the recent suspension of operations at its *Cork-Province* mine near Kaslo. Zinc was the principal metal produced.

ALASKA—A federal court judge has ruled that gravel and sand are not minerals and, therefore, cannot be discovered. The judge dismissed suits brought by three Anchorage firms attempting to obtain clear title to Territorial school lands near Anchorage.

EUROPE

EIRE—Drilling is to begin shortly on two state-owned mineral properties following surveys by Dr. W. R. Jones. These are at Abbeytown, County Sligo, where lead-zinc mines are being worked by *Abbeytown Mining Company, Ltd.*, and at Murvey near Roundstone, County Galway, where some molybdenite is being sought.

FRANCE—*Societe Languedocienne de Recherches et d'Exploritations Minieres (Company of Investigation and Exploitation of Mines of Languedoc)*, which developed the native sulphur deposit of Malvezy not far from Narbonne, Aude Province, has suspended its production because of the suspension of a government subsidy. The ore had been treated



Austria's Two-Converter Steel Plant

Combining many of the advantages of the open hearth and the Bessemer converter with simultaneous elimination of the disadvantages characteristic of both methods, a new "oxygen refining process" successfully passed a four-year testing stage when the Vereinigte Oesterreichische Eisen und Stahl Werke (United Austrian Iron and Steel Works) (VOeEST) of Linz, Upper Austria, put into operation the first 2-converter plant during 1953. A view of the five blast furnaces at the plant is shown at left above. At the start of research during 1949, the team of VOeEST scientists first used a two-ton converter, later switched to a 15-ton. It was Dr. Hauttmann, Dr. Trenkler, and engineer Rinesch who thought, following a suggestion of Switzerland's Professor Durrer, of directing the oxygen blast onto the processed iron's surface in the container, instead of directing the blast from the bottom of the converter to the surface. The metallurgical process starts at the point of the liquid iron's surface, onto which the blast of pure oxygen is directed. Blasting onto the surface permits higher temperatures, compared with the former method of injecting an air-oxygen mixture through bottom-located nozzles. This also represents a drastic change from former methods in which the metallurgical process starts evenly over the entire surface. The most important feature of the processing consists in the coordination of the amount of oxygen, the pressure applied to the blast, and the dimensions of the converter. The result of this coordination is achievement of maximum movement of the charge without prematurely damaging the fireproof brick layer within the converter. The operating converters, one of which is shown above at right, have a minimum capacity of 150,000 tons of steel annually.

Above: Agidisc on metallurgical concentrate in New England.

Eimco Agidisc Increases Metallurgical Filtration Efficiency

Eimco Agidisc Filters are increasing the production per square foot of filter area in metallurigcal plants.

The Agidisc keeps a fast settling slurry in solution so gently that no eddies are created to disturb the cake formation on the disc. The result of this gentle agitation is a thick even cake over the entire surface of the sector with a resultant uniform drying of the cake, free discharge from the cloth and longer bag life.

Agidisc filters will enable you to realize greater production per square foot of filter area over standard disc design if your slurry contains fast settling particles that settle in the tank. The test of this will be in observation of the operation of your filter. If you see a classification ring as shown in Fig. 2 at right, you are paying the penalty of poor production, high moisture in cake and short bag life.

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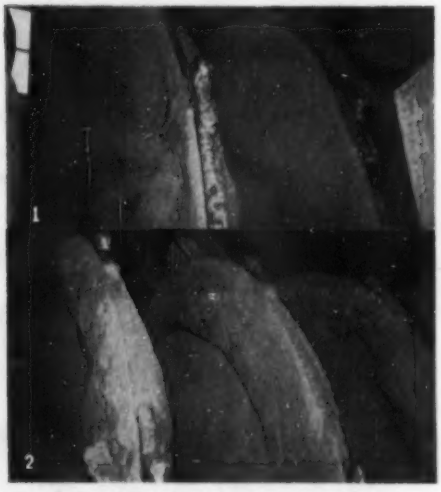
1. An agidisc filter working on the same feed copper concentrate feed line at the same time as the standard disc. (2) Note classification ring on standard disc. Agidisc delivers 20% more cake with 2% less moisture.



Below: Coal fines filtered on Eimco fitler—note smooth even cake over sectors.

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by flotation. Concentrates (80 percent S) were purified and the product obtained was 99 percent sulphur. The yearly output had reached an average of 20,000 tons.

SPAIN—*Minas de Almaden* has completed test runs on its new furnaces and normal operations are under way.

YUGOSLAVIA—*Srebrenica* in East Bosnia, the ancient lead-zinc mine, is being reopened. Large bodies of ore have been found under the old workings. Srebrenica has been famous for more than 2,000 years; Illyrians, Romans, and Saxons drew some of their wealth from these silver-and gold-bearing ores. The invasion of the Turks stopped mining there, and the Austrians investigated the mines much later but could not find ore. Recent geological researches have been successful, however, and production is expected in 1954.

CYPRUS—*Cyprus Sulphur & Copper Company, Ltd.*, a wholly owned subsidiary of *Esperanza Copper & Sulphur Co., Ltd.*, is reported to have come to terms with German buyers and a three-year contract has been signed for the sale of run-of-the-mine ore from the *Kinousa* workings. Though the price agreed upon is not as high as in some previous arrangements, the fact that it is of longer duration will enable the company to engage in systematic planning. Plans are under consideration for the erection of a plant to treat Kinousa ores, and this ties in with a second contract which has been concluded with respect to the estimated output of pyrite and sulphur concentrates from the new mill which is expected to be in operation early this year.

ITALY—A new sink and float unit has been completed in the west section of *Montevecchio*, largest lead-zinc mine in Sardinia. Trial runs have been made and regular operation is scheduled shortly. This is the second unit of its kind to be installed at Montevecchio.

AUSTRIA—Reactivation of the *Roehrerbuehel* copper mine is presently being undertaken jointly by *Mitterberger Kupferberbau G.m.b.H.* and the *Tiroler Kohle und Erzbergbau G.m.b.H.* Copper ore was produced in 1539, and the famous German Fugger family produced about 150,000 tons of copper metal during 80 years of operation. The full length of the shaft (about 450 feet) was then sunk completely without explosives. One level is now being worked, and it is hoped that full-scale mining operations can start soon.

ENGLAND—In the Weardale and Teesdale areas of Durham County, the *Nentsbury* mine which was recently reopened for lead and zinc has closed and the *Cow Green* barite mine is also scheduled to close. Both properties were operated by *Anglo-Austral Mining Co. Ltd.* which also produces some fluorspar from a mine in Weardale and treats it in its flotation plant at Nenthead. One mine is being reopened by the *Weardale Lead Company*. Known as the *Barbary* mine, it is expected to produce both lead and fluorspar. At Allendale, the *Allenheads* mine is reported to be closing. Work there was on a lead-zinc-fluorspar lode.

ITALY—*Societe Cozzo Disi* is reported to have placed a Denver flotation plant in operation which is expected to yield a 95 percent sulphur concentrate. *Societe Valsalso* is expected to install a flotation plant soon, which had been on order for two years from the German firm of *Hum-*

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boldt. Following a recent re-examination of reserves, which gave disappointing results, the company abandoned its intended purchase of a Languedocienne refinery plant and chose the Humboldt filter plant instead. The *Montecatini* company is installing a Masobello plant at the *Perticara* mine in Northern Italy and *Compania Generale Zolfi* is installing a similar plant at the *Saponaro* mine in Sicily.

PORTUGAL—At the *Panaqueira* tin and tungsten properties of *Beralt Tin & Wolfram Ltd.*, almost all of the ore reserves above the main adit have been depleted. However, sufficient ore to last another few years has been blocked out at a depth of 200 feet between the main adit and the No. 1 level. Also work between that level and the No. 2 level which is 325 feet lower, is giving promising indications of continuity of the veins at least to that depth. At the Vale da Ermida section, a quantity of ore has been milled and has confirmed the belief that tin- and tungsten-bearing ore occurs in an extensive block of ground probably totaling millions of tons. The average values, however, are not likely to be high enough to make the development at present base metal prices a profitable proposition. Nevertheless, the possibility exists that low-cost bulk mining methods may one day be introduced.

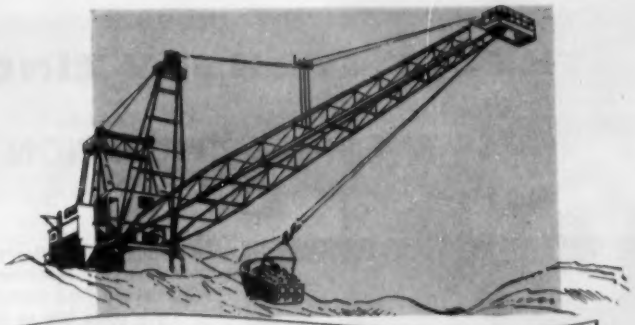
YUGOSLAVIA—Geological investigations of the *Majdanpek* mine in North East Serbia, have indicated 105,000,000 tons of ore containing 0.85 to 0.90 percent copper and an economical amount of pyrite. Until now the mine had produced pyrite and limonite. Adits, prospect shafts, and drill holes have been driven. Mining is planned partly by surface workings and partly by underground work. The flotation plant will have to have a capacity of 10,000 tons of ore per day. The concentrates will be smelted at *Bor*, 35 kilometers southeast of Majdanpek. Yearly metal production from the mine is calculated at a rate of 25,000 tons copper, 30 tons silver, and 3 tons of gold. Production is expected not earlier than 1957.

ENGLAND—The two main tin producers in Cornwall, namely the *Geevor* and *South Crofty* mines, continue production although the reduced price of tin has had considerable effect on the profits of the latter with the present high pumping costs. This condition should be greatly improved when the new pumping installation is completed and if an increase in tonnage milled can be obtained. Work on the pumping installation is progressing satisfactorily while development work has started again on the Complex lode. This unusual lode, deep in granite, carries both tin and tungsten.

ITALY—Production of acid-grade fluorspar has been substantially increased by a new flotation plant erected at a mine in the Lombardy Alps, Province of Bergamo, which until now had only produced metallurgical grade fluorspar.

AUSTRIA—Production during October 1953 was as follows: iron ore 252,670 tons; lead-zinc ores 11,083 tons; copper ore 13,953 tons; sulphur none; antimony ore 1,096 tons; anhydrite and gypsum 28,242 tons; and magnesite 83,513 tons. The province of Styria leads Austria's nine provinces in mine production.

YUGOSLAVIA—A pilot plant is under construction at the Polyvinil factory near Split, Dalmatia, to treat antimony concen-



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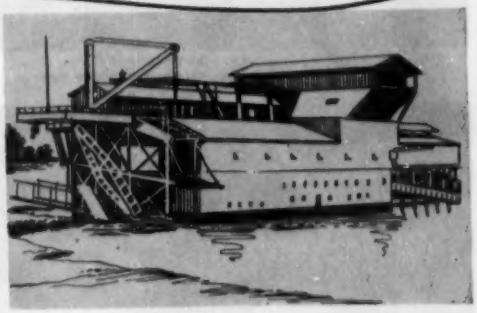

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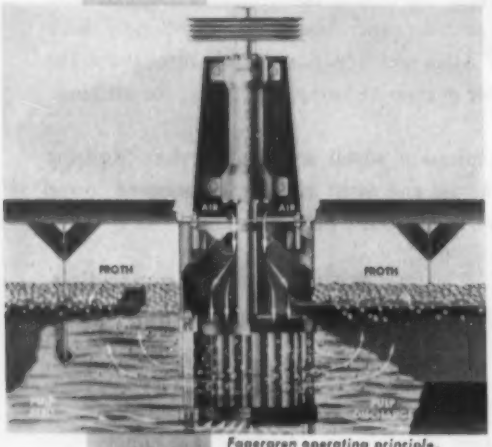
Fagergren cells in flotation circuit at Austinville mill of The New Jersey Zinc Company.

Closeup view of Fagergren cells at The New Jersey Zinc Company installation.



Fagergren operating principle.

In recent years, an impressive total of 154 Fagergren Flotation Machines has been ordered by The New Jersey Zinc Company. A substantial number of these units are in operation at the Austinville, Virginia, and Hanover, New Mexico, mills with the balance to be installed at the company's new Friedensville, Pennsylvania, mill. The satisfactory operating results obtained with Fagergrens by this company in the treatment of zinc and lead ores — together with the many repeat orders received from other large operators — attests to the wide acceptance Fagergrens have among major producers of metallic and non-metallic minerals.

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trates from Serbia. The pilot plant will use the Ruthner process whereby antimonite is dissolved in sodium sulphide. The resulting antimony-sodium sulphide solution is mixed with sodium amalgam, whereby pure antimony powder is precipitated. At Brazina on the Drina River in northwestern Serbia, a new concentrator has started operation treating 200 tons of antimony ore daily. An 8-kilometer tramway has been erected to connect the plant with the *Zajaca* mine.

GREECE—The *Eleusis Bauxite Mines, Inc.* are reported to have been completely mechanized and now producing 1,000 tons of ore per day. The bauxite is shipped to Germany where it is converted into aluminum.

FINLAND—Chilean copper and iron ore are reportedly being sought by Finland on a barter exchange system. Involved in the transaction are 50,000 tons of copper and 1,000,000 tons of iron ore. According to the plan, 10 ocean liners, 500 trolley buses and taxis could be sent to Chile in exchange for the metal. The price contemplated is 35 cents per pound which Chile has been unsuccessfully demanding on the world market for several months.

AUSTRIA—The *Anglo-International Industry Ltd.*, the *Alliance Européène*, and United States industrial circles are reported to be interested in mining of kyanite in the district of Koralpe, Carinthia province. Estimates of geologists disclose "considerable" amounts, deposited especially in the Kragerberg and Kreuzkogel Mountains. The funds necessary to bring the area into production are said to be so large that only international circles could undertake the project.

QUEENSLAND—*Mount Isa Mines Ltd.* is tending to increase output of copper at the expense of lead while present prices hold. The shaft, used for hoisting both lead and copper, is handling about 90,000 tons monthly. Copper is being refined both in the United States and at the works of *Electrolytic Refining and Smelting Company* at Port Kembla, New South Wales. The Australian copper price remains at £A300 per ton. Additional ore is reported to exist outside of the published reserves of 3,911,000 tons assaying 3.9 percent copper. During the year ended June 30, 1953, ore development exceeded extracted ore by 146,000 tons in the copper body.

PHILIPPINE ISLANDS — *Atok-Big Wedge Mining Company* has suspended operations at its gold property in the Baguio district to prevent further heavy losses brought about by the falling price of metal and rising production costs. The company's board of directors decided to close the mine down temporarily and wait for more favorable developments. Closure was precipitated by an adverse decision of the Wage Administration Service of the Department of Labor. The WAS, after an investigation into conditions at the mine, decided to allow the management to deduct only 70 to 80 centavos from a mine worker's daily wage to cover the cost of facilities extended by the company to each worker. This compares with Pesos 1.80 which the firm was allowed to deduct previously. The firm is reported to have been losing about Pesos 70,000 monthly.

NEW SOUTH WALES—*Mines Exploration Pty. Ltd.*, a subsidiary of *Broken Hill South Ltd.*, has now explored the *Conrad* mine at Howell to 700 feet. A flotation plant capable of treating up to 50,000 tons of ore per year is being built. This is a lead-zinc deposit which was worked mainly from 1907 to 1912, producing 167,000 tons of ore containing 3,832 tons of lead. High silver content is anticipated.

PHILIPPINE ISLANDS—Chromite ore being mined by *Benguet Consolidated Mining Company* for *Consolidated Mines Inc.* at Masinloc, Zambales, is being shipped to the United States for the government's stockpile. Current shipments are about 57,000 tons per month of refractory grade ore. With the completion of a new mine railroad this winter, deliveries are expected to be increased to 75,000 tons per month.

TASMANIA—*Mount Lyell Mining and Railway Company Ltd.* has increased its ore reserve position by planning deeper mining of the West Lyell opencut. An increase of 18,000,000 tons brings the total to 46,567,000 tons assaying 0.73 percent Cu, 0.049 ounce silver, and 0.008 ounce gold per ton. Production of blister copper in the year ended September 30, 1953, was 8,718 tons, compared with 9,123 tons in the previous year.

FIJI ISLANDS—*Loloma (Fiji) Gold Mines N.L.* in the year ended June 30, 1953, treated 19,413 long tons to recover 19,097 ounces of gold and 7,548 ounces of silver. The gold output declined by 4,942 ounces over that of the previous year. *Emperor Gold Mining Company Ltd.* treated 156,982 tons for a profit of £91,903. Ore reserves are 850,000 tons assaying 7.9 dwts., including a conservative amount of ore being exposed on No. 9 level.

NORTHERN TERRITORY—*Peko Tennant Creek Gold Mines N.L.* will give priority to extraction of copper ore rather than the gold ore. Foundations for plant installations are complete. The company states that the fluo-solids roasting process is suitable for copper concentrates likely to come from the mine. It is expected that in initial stages gold-copper concentrates will be sent to the custom smelter at Port Kembla, New South Wales.

PHILIPPINE ISLANDS—*General Base Metals, Inc.'s* shipment of manganese ore in December was the largest it had made during 1953. The ore was shipped from Bohol. The firm is the largest manganese producer in the Philippines. Prospects for the new year are reported to be much better than during the past years. The present contract which the company has for the sale of its ores does not expire until March 1954. Reported to be the largest Philippine contract ever given to any one buyer, a still larger contract is being negotiated for 1954 and 1955. Testing of the company's property began in August 1953 under the supervision of the United States Geological Survey and the Philippine Bureau of Mines. The experimental program on the property developed about 1,300,000 tons of manganese ores of all grades up to October 31. Approximately 200,000 tons of these ores can be treated for upgrading to shipping

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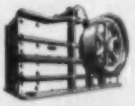

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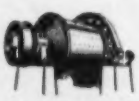
Gyratory Crushers



Grinding Mills

Kilns, Coolers, Dryers

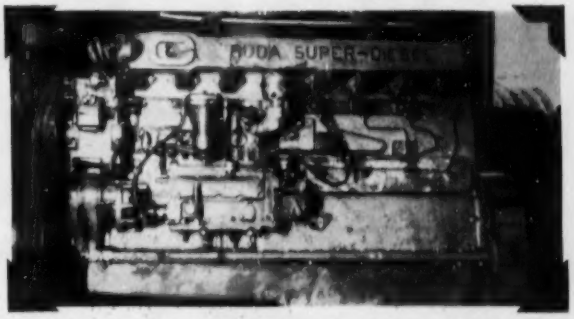
THE ENGINEER'S REPORT

DATA

LUBRICANT	RPM Delo Oils
UNITS	21 Buda diesel engines
OPERATION	Hauling ore
CONDITIONS	Heavy duty — 8-15% grades
PERIOD	6 years
FIRM	Bagdad Copper Corp., Bagdad, Arizona

No stuck rings in 21 engines in 6 years hauling ore!

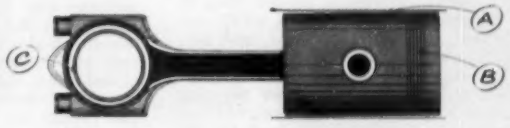
HAULING 22-TON LOADS up 8 to 15% grades out of the Bagdad Copper Corp. open-pit mine, 21 Buda diesels have had no stuck rings, no clogged ring grooves since using RPM DELO Special Lubricating Oil for



the last 6 years. Engines operate 2 shifts a day, 6 days a week in heavy abrasive dust. Torn down after 7000 hours, all parts in the engine above were exceptionally clean and all bearings were good.

BIGGEST OFF-HIGHWAY TRUCK IN THE WORLD (above) was recently built for Bagdad Copper Corp. It weighs 96,000 pounds, hauls 75 tons. RPM DELO Special Lubricating Oil was also selected for its two 350 H.P. supercharged Buda diesels because of the excellent service Bagdad has had from this oil.

How RPM DELO Oils keep engines clean and prevent wear



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grade in the present washing plant of the company.

NEW SOUTH WALES—*Titanium Minerals Ltd.* has granted an option to *Austral Malay Tin Ltd.* to test the company's areas. Samples are said to show two pounds of tin per cubic yard. The area is about 15,000 acres near Woodburn, North Coast. Titanium Minerals ceased mining for rutile in August following the fall in price but will resume if there is sufficient increase.

NEW ZEALAND—The proposal to produce heavy water from the field of geothermal steam at Wairakei has been abandoned since the British government, which was to join the New Zealand government in the venture, has withdrawn from the project. New Zealand will now concentrate all of its efforts on the generation of power from the area.

QUEENSLAND—*Tableland Tin N.L.* has resumed operation of its dredge after its transfer to Smith's Creek. It now has to pump water and draw power a distance of nine miles from the company's utilities near the former site at Return Creek. From November 5 to December 8, the dredge treated 200,901 cubic yards in 616 hours for 50 tons of concentrate.

NEW SOUTH WALES—The No. 3 shaft at *North Broken Hill Ltd.* has passed the 1,000-foot mark. Expenditures up to June 30th, 1953 had exceeded £A2,500,000 and are expected to total about £A4,500,000. The present shaft-sinking and construction program is expected to be completed during 1955. Near Armidale, *New England Antimony Mines N.L.* has acquired an option over the *Magwood* mine of *Victorian Antimony Mines Ltd.* It is hoped to mine 400 tons of ore monthly averaging 20 percent antimony, after dilution. Victorian Mines had suspended antimony operations at Costerfield, Victoria, but will now resume using capital obtained from New England Antimony for the Magwood option.

QUEENSLAND—In the year ended June 30, 1953, *Mount Morgan Ltd.* produced 10 percent more copper than in the previous year. Output was 6,237 tons of blister, 61,640 ounces gold, and 24,220 ounces silver. Quoted ore reserves of 17,500,000 tons assaying 1.03 percent copper and 2.68 dwts. gold per ton give the mine a life of at least 20 years at the present extraction rate of about 60,000 tons of ore per month.

WESTERN AUSTRALIA—*Northwest Tantalum N.L.* will mine tantalum, columbium, and beryllium at several places in Western Australia formerly operated by *Tantalite Ltd. Blue Spec Mining Company N.L.*, antimony-gold producer, will have an interest in the company. The University of Western Australia has received 6,000 shares in recognition of technical services rendered to the mining industry by Australian universities. Operations are expected to begin in six months.

NEW ZEALAND—*Freeburgh Dredging N.L.*, during the year ended August 15, 1953, treated 389,106 cubic yards including 20,000 yards of tailing to recover 1,821 ounces of gold. The dredge operates near Bright. Working a few miles away on the same river (the Ovens), the dredge of *Harrietville (Tronoh) Ltd.* is still having difficulties because of old tailings. Recent returns are at a rate of 150 to 200 ounces weekly from 50,000 to 60,000 cubic yards.

TASMANIA—Most of the *Electrolytic Zinc Company of Australasia's* expansion program is expected to be completed during 1954. According to the chairman of the company, the end of price control on zinc benefited the company because an increased local price offset decreases in overseas prices. When new construction is completed, annual sulphuric acid making capacity will be 120,000 tons. Output for four weeks in November-December showed 16,603 tons of ore treated to produce 699 tons of lead concentrate, 4,308 tons of zinc concentrate, and 510 tons of copper concentrate.

NEW GUINEA—For the six months ended November 30, 1953, *Bulolo Gold Dredging, Ltd.* dredged 6,431,850 yards to recover 36,784 ounces of fine gold. This compared with 8,871,500 yards dredged in the same period of 1952 to recover 57,358 ounces of fine gold. Gold production for the year ended May 31, 1953 amounted to 115,745 fine ounces, or approximately 36,000 ounces in excess of the previous year's production. The increase was brought about largely by changes in the coursing of the dredges which will also benefit production in 1954 and 1955. Dredges 2, 4, and 8 were closed down early in the year and No. 8 was closed down in March. It is estimated that dredge No. 2 will be closed down in May 1954 and No. 4 about a year later. The deep digging dredges, No. 5 and 7, are expected to continue in operation until 1960 or thereabouts.

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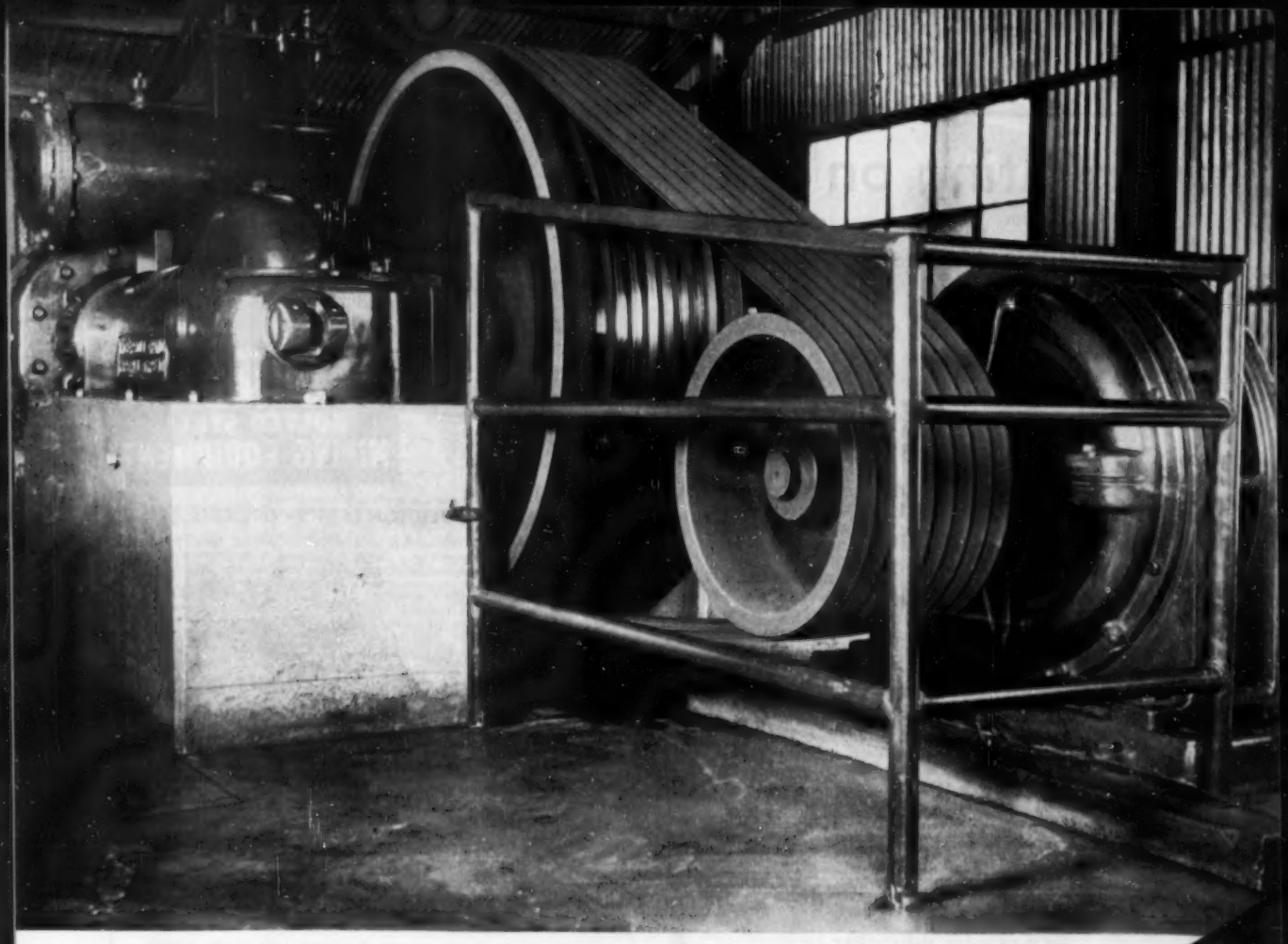

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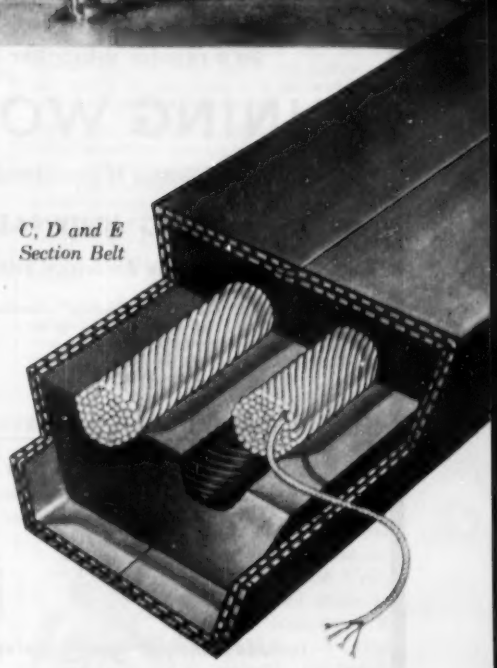

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U.S.A. Metal & Mineral Prices

METALS

January 19, 1954

COPPER:	**Electrolytic.** Delivered F.o.b. cars, Valley basis	29.50-30.00¢
	Lake. Delivered, destinations, U.S.A.	30.00¢
	Foreign Copper. Valley basis	29.50-30.00¢
LEAD:	**Common Grade.** New York	13.50¢
ZINC:	**Tri-State Concentrates,** jig, flotation 80% lead, per ton	$166.50
	Prime Western; F.o.b., E. St. Louis	10.00¢
	Prime Western; Delivered, New York	10.50¢
	Tri-State Concentrate, 60% zinc, per ton	$56.00
ALUMINUM:	**Primary 30 Pound Ingots (90% plus).** F.o.b. shipping points	21.50¢
ANTIMONY:	**Lone Star Brand.** F.o.b. Laredo, in bulk	29.00¢
BISMUTH:	(In ton lots) price per pound	$2.25
CADMIUM:	**Sticks and bars.** 1 to 5 ton lots (Price per pound)	$2.00
COBALT:	**97-99%,** keg of 550 pounds (Price per pound)	$2.60
COLUMBIUM:	**Powder** Nom., per pound	$75.00
MAGNESIUM:	**Ingots (99.8%).** F.o.b. Freeport, Texas	27.00¢
MERCURY:	**Flasks.** Small lots, New York	$188.00-$190.00
NICKEL:	**"F" Ingots (5 pounds).** F.o.b. refinery,, Port Colbourne, Ontario	60.00¢
TIN:	**Grade A Brands.** New York (Price per pound) Prompt delivery	85.50¢
TITANIUM:	**99.3%** + (Price per pound)	$5.00
GOLD:	United States Treasury price	$35.00 per ounce
SILVER:	**Newly mined domestic.** United States Treasury price	90½¢ per ounce
	Foreign Handy & Harman	85.25¢ per ounce
PLATINUM:		$91.00-93.00
ZIRCONIUM:	**Powder,** 100 pound lots, per pound	$7.00

ORES AND CONCENTRATES

BERYLLIUM ORE:	**10 to 12% BeO.** F.o.b. mine, Colorado	$45.00 per unit
	Small lot purchases at Custer, S. D., Spruce Pine, N. C., and Franklin, N. H. Visual inspection at $400.00 per short ton or by assaying at: 8.0 to 8.9% BeO, $40 per unit; 9.0 to 9.9%, $45; over 10.0%, $50.	
CHROME ORE:	F.o.b. railroad cars eastern seaports. Long tons dry weight.	
	African (Rhodesian). 48% Cr_2O_3. 3 to 1 Ratio	$44.00-$46.00
	African (Transvaal). 48% Cr_2O_3. No Ratio	$34.00-$35.00
	Turkish. 48% Cr_2O_3. 3 to 1 chrome-iron ratio	$54.00-$56.00
	U. S. Government ore purchase depot Grants Pass, Oregon, Base price, lumpy ore, $115.00; fines and concentrates $110.00 for 48% Cr_2O_3 and a 3 to 1 chromium-iron ratio. Premiums for higher grade ore and for a ratio up to 3.5 to 1. Penalties for grades down to 42% Cr_2O_3.	
COLUMBIUM-TANTALUM ORE:	At United States small lot beryl purchase depots. $3.40 per pound contained combined pentoxides in 50% ore.	
IRON ORE:	Lake Superior. Per gross ton Lower Lake Ports	
	Mesabi, Non Bessemer, 51.5% Fe. Second quarter	$9.90
	Mesabi, Bessemer, 51.5% Fe. Second quarter	$10.05
	Old Range Non Bessemer. Second quarter	$10.15
	Old Range Bessemer. Second quarter	$10.30
	Swedish, Atlantic Ports, 60 to 68% Fe, Contracts, Per Unit	20.00¢
MANGANESE ORE:	**Metallurgical grade.** 46 to 48% Mn. Long ton unit	$1.05-$1.07
	Chemical grade. 80% MnO_2. Per ton	$70.00
	Domestic U. S. Government are purchasing depots: Deming, New Mexico; base price $2.30 per long dry ton unit of recoverable manganese less handling and treating costs. Wenden, Arizona; base price of $8.54 per long dry ton of 15% manganese ore. Butte, Montana; (black and pink ores) base price of $4.87 per long dry ton of 18% manganese ore. Phillipsburg, Montana base price of $6.43 per long ton unit of 15% manganese ore. Small lot program f.o.b. railroad cars, minimum 40% Mn. Base price (48%) $2.30 per unit with premiums and penalties.	
MOLYBDENUM CONCENTRATE:	90% MoS_2 F.o.b. Climax, Colorado. Per pound of contained molybdenum, plus cost of containers	$1.00
TUNGSTEN CONCENTRATE:	**Domestic.** 60% WO_3 Per short ton unit	$63.00-$65.00
	Foreign. 65% WO_3 Per short ton unit (Scheelite)	$32.00
URANIUM ORE:	**Carnotite-Roscoelite.** F.o.b. purchase depot plus $0.06 per ton mile ($6.00 maximum), Grand Junction, Rifle, Durango, Naturita and Uravan, Colorado. Salt Lake City, Marysvale, Thompsons, and Monticello, Utah. Shiprock, New Mexico, Edgemont, S. Dakota. Base price for 0.10% ore is $1.50 per pound and up to $3.50 per pound of contained U_3O_8 plus $0.75 per pound for each pound in excess of 4 pounds per short dry ton and an extra allowance of $0.25 per pound for each in excess of 10 pounds. A $0.50 per pound development allowance paid on all ores purchases. At Shiprock all ores with more than 6% lime are penalized for excess lime.	
VANADIUM ORE:	**Carnotite-Roscoelite.** V_2O_5 in ratio of more than 10 parts to 1 part of U_3O_8 are generally acceptable at all AEC depots, but excess not paid for at Marysvale, Monticello and Shiprock.	Per Pound V_2O_5, $0.31

NON-METALLIC MINERALS

BENTONITE:	**Minus-200-mesh.** F.o.b. Wyoming points. Per ton in carload lots	$12.50
	Oil Well grade. Packed in 100 pound paper bags	$14.00
FLUORSPAR:	**Metallurgical grade.** 70% effective CaF_2 content per short ton F.o.b. Illinois- Kentucky mines	$42.50
	Mexican. 70% f.o.b. border	$30.00
	European, Atlantic Ports, 70%	$37.00
	Acid Grade. 97% CaF_2 F.o.b. Kentucky, Illinois, Colorado	$60.00
PERLITE:	**Crude:** F.o.b. mine per short ton	$3.00 to $5.00
	Plaster grades. Crushed and sized. F.o.b. plants	$7.00 to $9.00
SULPHUR:	Long ton, F.o.b. Hoskins Mound, Texas	$25.50
	Export	$30.50

LONDON METAL AND MINERAL PRICES

January 16, 1954

		Per Long Ton	USA Equivalent cents per pound[1]
COPPER:	**Electrolytic, spot**	£219 0s 0d	27.37¢
LEAD:	**Refined, 99.97%**	£84 15s 0d	10.59¢
ZINC:	**Virgin, 98%**	£71 0s 0d	8.87¢
ALUMINUM:	**Ingot, 99.5%**	£156 0s 0d	19.50¢
ANTIMONY:	**Regulus, 99.6%**	£210 0s 0d	26.25¢
TIN:	**Standard, 99.75%**	£657 10s 0d	82.19¢
TUNGSTEN:	**Long ton unit, 160-170s, equivalent to**		$22.40-$23.80

1. With Sterling pound at $2.80.

Quotations on metals and certain ores through the courtesy of *American Metal Market*, New York, N.Y.

"ORIENTED" DIAMONDS

Make Sprague & Henwood Bits

CUT FASTER— LAST LONGER

Always a leader in its field, Sprague & Henwood, Inc. PIONEERED the development of ORIENTED Diamond Bits; in which each individual diamond is set with its hardest rib or "vector" toward the work.

As of the present date we have produced more than FIVE THOUSAND oriented bits, in a wide variety of types and sizes, with both cast and powdered-metal matrices; and have proved, by extensive comparative tests in our own contract drilling operations, that they cut much faster and last much longer than bits in which the diamonds are set at random.

Only selected diamonds of certain crystaline structure can be used and only specially trained and equipped setters of more than usual aptitude can be relied upon to orient diamonds correctly in the mold, but we are now fully organized for efficient production of ORIENTED DIAMOND BITS, at no additional cost to the purchaser.

In terms of footage cost, these are the most economical diamond bits ever produced and we invite inquiries on that basis. Bulletin No. 320 illustrates and describes all types and gives complete data.

CONTRACT CORE DRILLING

We do drilling by contract and are one of the oldest and largest contractors for any type of core drilling. Experienced crews are available on short notice for service anywhere in the United States and many foreign countries. Estimates submitted promptly on request.

Sprague & Henwood, Inc.

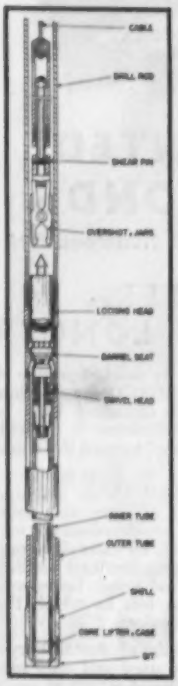
SCRANTON 2, PA.

Branch offices: New York, Philadelphia, Pittsburgh, Grand Jct., Colo., Buchans, Newfoundland

PRODUCTION EQUIPMENT PREVIEW

PEP is just what new equipment, increased mechanization, and new methods can give to your mine, mill, or smelter. This PEP section is MINING WORLD'S way of making available to you some of the finest current information on mechanization.

Longyear's New Wire Line Diamond Drill Core Barrel



The E. J. Longyear Company has provided a new tool and technique to the diamond core drilling industry that promises to revolutionize exploratory drilling. This new tool, Wire Line Core Barrel equipment, has been under continuous development and tests by this company since 1947. A number of BX holes ranging in depths from 500 to 3,200 feet have been successfully completed. At the present time a hole is being drilled which is expected to reach a depth of 5,000 feet.

The principal of Wire Line Core Barrel has been used for many years by the petroleum industry, but has never before been successfully applied to small diameter diamond core drilling.

When using this new core barrel the drill rods are hoisted and lowered into the hole only when it is necessary to replace the diamond core bit. This results in a great saving of time. The new tool is also credited with greatly improved core recovery and longer bit life. For complete information on the use of this equipment circle No. 65.

Portable Ultraviolet Lamp Is Self-Contained

Menlo Research Laboratory has developed a compact new Blacklight Wand model for immediate addition to its series of "Fluoretor" portable ultraviolet instruments. Field tests indicate the new Wand will broaden the use of ultraviolet detection and comparison in a wide range of scientific and commercial activities.

Miniaturization of the electronic components has enabled reduction of total weight including two standard flashlight batteries to only 1¾ pounds.

Factors of ready portability and independence of normal power outlets make the Blacklight Wand particularly useful in field work such as mining, prospecting, geology, and minerals testing. One large mining company is said to have provided the manufacturer with data showing that the instrument ". . . has already saved us more than a half million dollars in detecting dilution of wolfram ore by low-grade scheelite." Circle no. 70.

Maneuverable 10-Tonner Added to Dart Truck Line

Recognizing a need in quarry and construction work for a fast, heavy-duty truck which would be highly maneuverable, the Dart Truck Company of Kansas City, Missouri, is now adding Model 10-S to its line.

The new 10-tonner has unusually rugged features. It uses the box section frame, the same type which is used on Dart's large ore-hauling trucks. Its forward one-man cab provides more driver visibility than any other truck of its type. Maneuverability in close quarters has been provided by designing the truck on a 100-inch wheel base. It turns in a radius of less than 20 feet.

An additional feature of the truck is its front end suspension. The front springs are extra long, providing easy riding. Two-stage springs are provided in the rear. Circle No. 61 for complete details.

New Low Price Chain Saw Weighs Only 20 Pounds

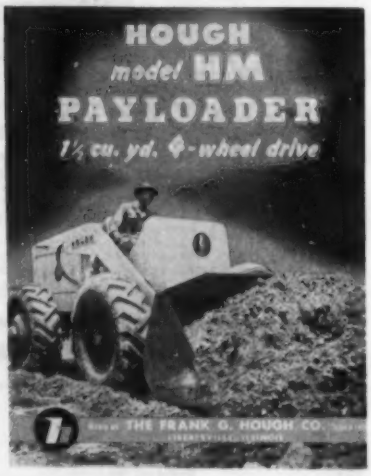
McCulloch Motors Corporation has just announced its Model 33 chain saw that weighs 20 pounds complete with blade and chain. Because of its extreme light weight and ability to saw full power in any position without adjustment, the Model 33 will be particularly valuable to all portable saw users.

It is powered by a special light-weight McCulloch gasoline engine with three-ring piston, hard-chrome-plated cylinder wall, and deep-finned aluminum-alloy cylinder with removable head. Automatic clutch, automatic rewind starter, fully enclosed flywheel, and anti-friction bearings are some of the many additional features found on the saw. All parts normally requiring inspection, such as spark plug or points, are easily accessible. Circle No. 62.

IT'S FREE (No.) CIRCLE IT

Loader Catalog Has Action Illustrations

The Hough model HR 4-wheel-drive Payloader tractor-shovel is the subject of a new 16-page catalog. Profusely illustrated, it contains action views of this unusual 1-cubic-yard machine doing earth and material handling jobs.



Exclusive and important details are fully highlighted. Included also are pictures and detailed specifications of all seven sizes of Payloaders. Copies of this catalog can be secured by circling no. 66.

WIRE ROPE HANDBOOK: The Leschen Wire Rope Division of Watson-Stillman Co. offers its valuable 64-page Wire Rope Handbook to interested readers. It tells how the higher-than-rated quality in Red-Strand preformed rope delivers longer-than-expected service. Circle No. 1 for your copy of the Wire Rope Handbook.

"ORIENTED" DIAMONDS make Sprague & Henwood bits cut faster and last longer. Only selected diamonds of certain crystalline structure can be used and only specially trained and equipped setters of more than usual aptitude can be relied upon to orient diamonds correctly in the mold. Bulletin No. 320 illustrates and describes all types of Sprague & Henwood bits and gives complete data. Circle No. 2.

ECONOMICAL FLOTATION: Agitair flotation offers great flexibility of control, and economies right down the line—in maintenance, reagent consumption, and wear and tear on mechanism and rubber parts. Bulletin No. 4A is a graphic and comprehensive description of Agitair Flotation. Circle No. 3.

FAST-SAFE COUPLERS: Willison Automatic Couplers require no manual assistance. There is no need for men to go in between the cars to couple or uncouple. The close coupling of Willison couplers eliminates damaging slack and permits higher speeds with maximum stability. National Malleable & Steel Castings Co. will send folder 5452, describing the automatic couplers, if you circle No. 4.

DURABLE CONVEYOR BELTING: Thermoid Conveyor Belts are made of strong cotton fabrics, thoroughly impregnated with high test rubber friction, and are combined with tough, wear-resistant rubber covers. They are then welded together under extremely high pressure to assure exceptionally strong, durable belting. Thermoid Western Co.'s catalog No. 3679 contains full engineering data and details on its line of conveyor belts. Circle No. 5 for your copy of this catalog.

TILTING MOTOR BASE: The new Lovejoy tilting motor base for use with variable speed pulleys can also be used as a belt tightener for standard sheaves and for easy belt changing on cone step pulleys. The new base, as well as flexible couplings, variable speed pulleys and transmissions, and universal joints are fully described in an 8-page brochure issued by the Lovejoy Flexible Coupling Co. Circle No. 10 for your copy.

MONEY-SAVING LUBRICANT: In a 56-page treatise on lubrication, entitled "Lubriplate Data Book," the Fiske Brothers Refining Co. tell how Lubriplate will improve the operation of your machinery and reduce maintenance costs. For your copy of the data book, circle No. 6.

NEW PROSPECTING DRILL: A small prospecting and blast hole drill incorporating new principles in drill design is now manufactured by the Hossfeld Co. This continuous feed drill powered with a five-horsepower gasoline motor drills 1½ to 2-⅝ inch holes using standard detachable rock bits. Drill cuttings are recovered through the hollow drill steel enabling the hole to be logged and assayed much like in churn drilling. Holes over 100 feet deep can be drilled using 16-foot lengths of coupled drill steel. Prospect holes can be drilled at any angle from vertical to almost horizontal, while blast holes can be drilled at any angle. The entire drill weighs only 1,300 pounds and can easily be disassembled into 100-pound units for transportation over rough terrain. For more information about this new drill, circle No. 7.

TRAMP METAL REMOVED: Powerful Stearns electro-magnetic pulleys effectively remove tramp metal from conveyor lines even though material flow is fast and belts are heavily loaded. The strong magnetic field provides maximum pull even when tramp metal is trapped between large pieces of bulk material. Descriptive catalog 303B, by Stearns Magnetic, Inc., gives all the details. Circle No. 8.

CUSTOM GRINDING: The establishment of a new custom grinding service has been announced by Majac Engineering Co. It is designed for large volume pilot work and for processors whose volume does not warrant installation of large pulverizing equipment. The two Jet pulverizers of the concern's own manufacture are suitable for reduction of a wide range of materials including limestone, iron ore, clays, feldspar, etc. Circle No. 13 for complete information.

DIESEL ENGINE USES: The many applications of Caterpillar Diesel Engines are covered by photographs and text in "The Power Parade," a booklet released by Caterpillar Tractor Co. Twelve sizes of engines ranging from 57 to 500 hp. are manufactured by Caterpillar, and because of the workmanship, they are "tinker-free." For your copy (Form 30757), circle No. 54.

CUT EXPLORATION COSTS: To find how to decrease diamond core drilling costs and increase core recovery Circle No. 35.

COUNTER WORKS IN PLANE OR CAR: The new Model 111 Portable Scintillation Counter is suitable for aerial surveys or surveys from moving vehicles. Made by Precision Radiation Instruments, the "Scintillator" has 100 times the sensitivity of the best Geiger Counter. Complete with the probe, it weighs only 8¼ pounds. A catalog describing the "Scintillator" and Precision's complete line of Geiger Counters and metal locators is available. Circle No. 9 for your copy.

LOWER FINE-CRUSHING COSTS: The new Telsmith heavier design Gyraspheres have a longer crushing stroke for greater capacity and a finer, more uniform product. The new mechanical features give lower up-keep and longer life, resulting in a lower crushing cost per ton. Bulletin 274, describes all the new design and mechanical improvements of the Smith Engineering Work's Style S Standard and Style FC Fine Crushing Gyraspheres. Circle No. 14.

LIGHTWEIGHT PORTABLE PUMP: Complete portability and functional simplicity are two of the many features of a new gasoline engine-powered pump made by Hypro Engineering, Inc. The pump weighs only 35 pounds complete with engine, fuel tank, and base plate. It has a capacity of 8 gallons per minute and a head of 10 feet unprimed. Primed, the pump has a 22-foot head. For additional information and prices of the Hypro pump, circle No. 15.

"TRAYLORED" CRUSHERS: Traylor Engineering & Manufacturing Co. has expanded facilities to build all sizes of Traylor Gyratory crushers. These crushers offer unusual operating economy and dependability to the producer who needs 645 to 3,500 tons hourly production. Complete information on the Traylor TC Gyratory crushers will be sent if you circle No. 16.

MULTI-ORE CONCENTRATORS: Stephan Concentrators offer a range of units and models for recovery of tungsten ores, monazite, gold, cassiterite, platinum, cinnabar, and various sulphides and oxidized ores. The Stephan Corporation also makes special placer units for exceptional gold recovery and for treatment of black sands. Bulletin GP-7 describes the various types of concentrators and is available by circling No. 17.

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to get further information on any item described in the Production Equipment Preview, note the key number of that item, circle the corresponding number on the PEP card at the right, and mail. If mailed from a point outside the United States, proper postage must be used.

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LOW-COST MATERIAL HANDLING: A useful 32-page bulk storage catalog, published by Sauerman Bros., Inc., tells how Sauerman Scraper systems provide low-cost handling of bulk materials. From ashes to heavy ore, indoors or outdoors, the Crescent Scraper's bottomless design provides fast loading to capacity and clean, automatic discharge. Circle No. 18 for your copy of this catalog.

HIGH-CAPACITY THRUST BEARINGS: A new application of single acting thrust roller bearings for heavy industrial use has been announced by Rollway Bearing Co. The type T-21906 bearing differs from most single-acting thrust bearings in that no center shaft is used to locate the bearing's roller assembly. A locating ring, which is roll pinned securely to the stationary plate, maintains the roller assembly in perfect alignment. This bearing has a rated capacity of 700,000 pounds. Circle No. 19 for further information.

FLOWSHEET FOR OXIDIZED Pb ORES: The answer to the complex problem of treating oxidized lead ores is suggested in Flowsheet No. M7-F26, published by Denver Equipment Co. For your copy of this flowsheet, circle No. 20.

"WIRE ROPE—USE AND ABUSE" is the title of a new booklet issued by the E. H. Edwards Co. The booklet tells how to stretch the life span of your wire rope. It lists a few of the common abuses of wire rope and tells you how to prevent them. Circle No. 21.

PROVEN WETTING AGENT: Monawet Mo, a wetting agent of the dioctyl sodium sulfosuccinate type, has proved its usefulness wherever penetration, wetting-out, or depression of surface tension are required. Mona Industries, Inc. gives further details in bulletin 212. Circle No. 22.

PORTABLE ULTRA-VIOLET UNIT: A new type fluorescent instrument known as "Black Light" is now available from the Goldak Co. The new unit weighs only 10 pounds and comes equipped with a carrying case, shoulder strap, and extra replacement tube. Free literature is available on the "Black Light." Circle No. 23.

TOUGHEST STEEL KNOWN: The American Manganese Steel Division has just released a new general catalog, describing its complete line of castings. Typical castings are shown in over 100 photographs with applications listed. You will find detailed information on power shovel dippers, teeth, chain, gears, sheaves, crusher parts, and many other applications. Circle No. 24.

LIGHT-WEIGHT SPUR GEAR HOIST: The Coffing Hoist Co. has announced that a new model hoist is available. Called the Challenger, it is a light-weight spur gear hoist of formed steel construction that features easy portability and resistance to shock load breakage. A four-page, two-color bulletin describes the new hoist. Circle No. 25 for your copy.

TROUBLE-FREE LEVEL CONTROL: The Scrayco Level Control, now on the market after four years of testing in industry, is the dry material handler's new time and dollar saver. It works without trouble on a range of materials from light to heavy, and fine, irregular, and coarse. It is guaranteed to give trouble-free performance in material weights from 5 to 500 pounds per cubic foot. Circle No. 26.

REVOLUTIONARY BORER: The foundation borer, an attachment for the Gar Wood 75 Series excavator, has introduced the unreinforced type foundation footing —completely outmoding the old, more expensive reinforced type footing. Form F-173, of the Findlay Division of Gar Wood Industries, Inc., describes the operation of the foundation borer. This machine, which has a revolving cylindrical bucket, bores a round hole of 44, 36, or 25 inches in diameter. The bucket can be raised and swung away from the hole to empty. The borer makes a clean, round hole without disturbing the surrounding ground and cement for the footing can be chuted into the hole immediately after excavation. Circle No. 27 for this informative bulletin.

DIESEL DONKEY: One-man ore handling is practical with this tri-wheeled, rubber-tired ore carrier. It will carry loads up to 3,000 pounds or 14 to 27 cubic feet, will climb grades up to 25%, and will turn in its own length. Made by Getman Brothers, this ore carrier is 102 inches overall in length and has a 58-inch wheelbase. An illustrated pamplet describing this ore carrier and Getman Brothers' mine shuttle car with capacities up to 17,000 pounds is available to interested readers. Circle No. 28.

SAVE 10 TO 25% over buying parts separately by using Lorain Parts Kits. These Parts Kits are bargain deals which have been established for the convenience of Thew-Lorain customers, as well as to save them money. The 24-page, 1953 Fall Catalog brings you a list of the Parts Kits which are available at present for Thew-Lorain Shovel Co.'s machines in the field. Circle No. 29 for your copy of the Parts Kits catalog.

SCINTILLOMETER FOR OIL OR URANIUM: The new model 969 Scintillometer was developed particularly for use in geological survey work, such as exploration for oil, uranium prospecting, and prospecting for nonradioactive minerals associated with uranium. It can be used for prospecting on foot, from a moving vehicle, and from low flying aircraft. The model 963 comes with an adjustable shoulder strap, and is contour-shaped in order to sling comfortably against the body. It weighs only 7 pounds and is built to withstand the most rigorous field conditions. The Radisc Co. will send literature explaining the use of its Scintillometer. Circle No. 30.

IMPROVED ROOF BOLT ANCHOR: Roof-Lock, the revolutionary steel expansion anchor for roof bolting, has been further improved by the development of Plug-Lock, a plug cast with depressions which are gripped by the anchor. This Plug-Lock model eliminates the need for straps, nuts, or costly staked ears on the bolt to hold the plug in position or to prevent the anchor from dropping as the bolt assembly is installed in the hole and tightened. Equipment Corp. of America's Roof-Lock offers such advantages as corrosion resistance, tremendous spring-steel holding power and fatigue resistance, simplified operation, and lower bolt cost. For complete details, circle No. 31.

ONE-YARD SHOVELS AND CRANES in the Lorain "50" Series are fully illustrated and described in a new 24-page bulletin just published by the Thew Shovel Co. There are operating views of the Lorain "50" cranes, shovels, hoes, clamshells, and draglines, as well as full explanations of the five interchangeable front ends and their accessory equipment. Circle No. 32 for your copy of this bulletin.

LOADER HAS 4-WHEEL STEERING: How to get around the corner in a hurry with four-wheel steering is demonstrated by a new materials handling Shoveloader. It uses the same steering principle as a hook-and-ladder fire truck to turn sharp corners despite its 19-foot length. Built by Baker-Lull Corp., the Shoveloader has an inside turning radius of only 7 feet, six inches. The 19-foot wheelbase increases stability of the machine by allowing full weight to be placed on the rear wheels for positive traction with peak pay-loads. For further information, circle No. 33.

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New Cooling Tower Design By Santa Fe Engineers

After holding faithfully to the basic pattern for many years, the Santa Fe Tank and Tower Company of Los Angeles has taken an aggressive step toward developing a cooling tower with a substantially improved construction design. The newly designed tower is said to require fewer parts for construction, is faster to erect, and requires less maintenance.

Branded the "MD-54," the new tower is the result of a series of laboratory and field tests that measured all performance factors in relation to its new structural features.

A new bracing system designed for minimum obstruction to the free flow of air results in better cooling performance. This new bracing requires only two specially designed joint connectors in conjunction with three standard braces to build any size or combination of sizes and shapes of the "MD-54" cooling tower. Circle No. 64 for full details on Santa Fe's new cooling tower.

Universal Offers 1½ and 3-Ton Diesel Trammers

The Universal Dredge Manufacturing Company has just added two new Diesel-powered trammers to their line of mine haulage locomotives. The 1½ and 3-ton trammers are fulfilling a definite need for light Diesel locomotives that will give increased power and be adaptable for long hauls.

The 1½-ton locomotive is powered by a two-cylinder Diesel engine. This power is diverted to the four wheels through a spring loaded clutch, single speed transmission, and roller chain drive. It has a 12-volt starting system. An exhaust gas scrubber for underground usage is an optional feature.

The 3-ton model is powered by a four-cylinder Diesel engine. Its power is transmitted through a torque convertor which supplies a three-to-one torque ratio for smooth and easy starting of the load. The exhaust gas scrubber is also available for this model. Circle No. 69 for further information on these two new trammers.

New Conveyor Idlers Announced by Pioneer

Three new conveyor idlers are in production by Pioneering Works, Inc. Each of the three rolls of the new Mesabi type impact idlers is equipped with Goodyear rubber segments 6¾-inch diameter, 1¾-inch wide, mounted side by side on a 2½-inch outside diameter seamless tube. Primarily designed to absorb the shock of falling material and thus prevent undue cutting and wear of the belt, flexibility of the segments permits the belt to run smoothly over the idlers even though the material may not be evenly distributed on the roll.

Two outstanding features on the new self-aligning troughing idlers are: (1) the frame is mounted on a pivoted base, and (2) the conveyor belt rides between two guide rollers. When the weight of the material on the ocnveyor belt is unbalanced, self-alignment is assured because the idlers swing freely to the left or right on the pivoted base. At the same time, the guide rollers hold the conveyor belt in line. For further information, circle no. 68.

R-21 Rock Wagon Holds 28 Cubic Yards of Ore

This "big rig" is the answer to mining companies and contracting firms who want equipment that will carry a large yardage of rock and yet still be capable of negotiating excessive grades and turning in a short radius. Developed by Finning Tractor & Equipment Co. and Gearmatic Co., the Rock Wagon is one of the largest vehicles of its kind ever built on a commercial scale.

Twelve months of research and engineering went into the production of the R-21 Rock Wagon. It is intended to meet a definite need in the earthmoving field. A 225 hp. Caterpillar model DW-21 tractor is used to pull the carrier. Circle No. 72.

This "Hopper-Type" Dipper Has All Cast Construction

A new "hopper type" all-cast dipper which incorporates the use of a streamline cutting edge has been developed by Electric Steel Foundry Company of Portland, Oregon.

The cutting edge has integral tooth horns to take solid manganese or alloy

steel teeth or alloy steel two-piece teeth. The front is designed with heavy rugged sections at maximum wear points.

An ESCO patented wedge-type door and latch mechanism is used with this dipper. The hinges are secured to the door by tapered wedges with shock-resisting rubber between door and hinges. Hinge design eliminates slamming and with the improved latch bar assembly, a full 7 inches of wear on the bar is possible by adjusting through 28 one-quarter-inch changes.

The dipper is designed for use on a Northwest 80-D machine and weighs approximately 5,300 pounds. Circle No. 78 for details.

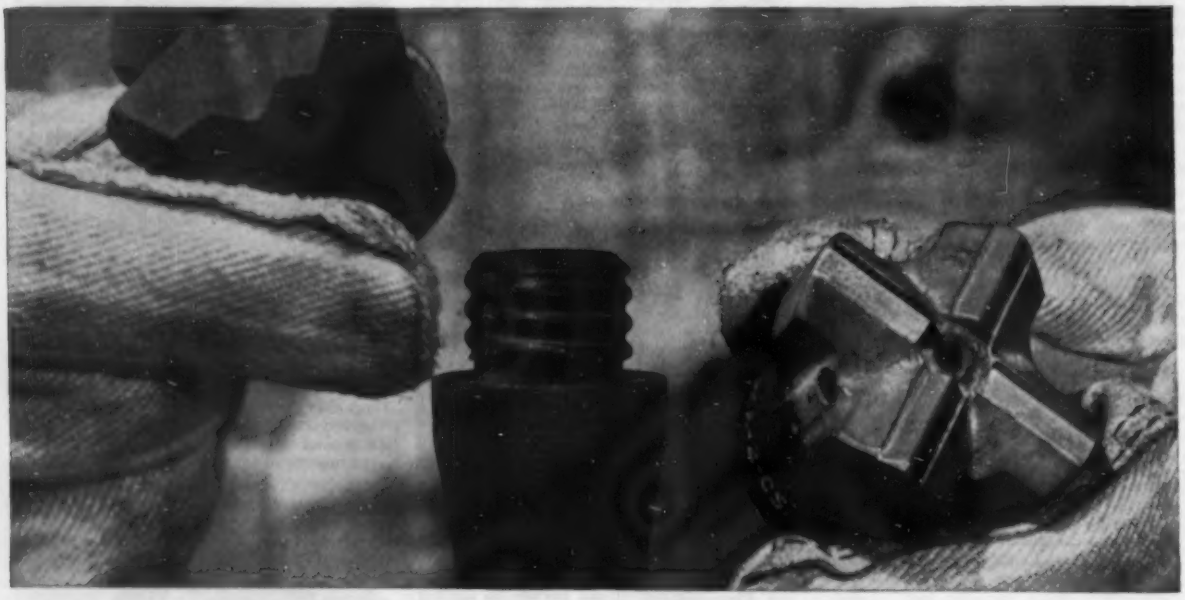
Hardened Bearings With Double Extended Race

Zone hardened Sealmaster ball bearing units with double extended race are now being manufactured by the Sealmaster Division of the Stephens-Adamson Manufacturing Company. Zone hardening is a patented process for induction heat treating the inner race ring of Sealmaster units —through the ball path section only. Since the extended portions of the race remain unaffected, the hardened threads of the set screws are able to bind tightly against the soft threads of the race for positive race to shaft locking. The double extension of the inner race ring affords maximum support of bearing on shaft

and guarantees a positive lock between the inner race of the bearing and the shaft. Shock and vibration resistance are increased since most of the inner race remains relatively soft and tough. Circle no. 60.

NO MORE TIME-OUTS TO CHANGE DRILL STEELS WHEN CHANGING BIT TYPES

Dozens of different TIMKEN® multi-use and carbide insert bits to fit the same steel!



WITH Timken® interchangeable rock bits, you can quickly change to the most economical bit as the ground changes—without changing steels! That's because dozens of Timken multi-use and carbide insert bits fit the same drill steel.

No time wasted going after a different set of drill steels every time a different type bit is needed. It takes the driller only about a minute to unscrew one type of Timken bit and screw the other type on the same drill steel.

You get added drilling economy when you use Timken interchangeable rock bits because they allow you to reduce your drill steel inventory. One set of steels in each thread series is all you need.

Both Timken multi-use and carbide insert bits give you two important advantages:

1) special shoulder union that keeps drilling impact from damaging threads,
2) made from Timken electric furnace fine alloy steel.

We'll gladly send a Timken rock bit engineer to your mine to arrange for a test. His on-the-spot analysis of your drilling problems can cut your drilling costs. There's no obligation. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, O. Cable address: "TIMROSCO".

WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.

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Armour Building $7 Million Florida Phosphate Plant

Armour Fertilizer Works is building a complete washing and flotation plant adjoining its present fertilizer plant three miles east of Bartow in Polk County, Florida. Frank M. Murphy and Associates, Inc. are doing the construction work on designs prepared by Attapulgus Minerals & Chemicals Corporation of Lakeland, Florida.

The five-story plant will provide cleaned phosphate concentrate for Armour's fertilizer plant which until now had been purchased from other phosphate companies. Rumored cost of the project is about $7,000,000, with half of this sum going into new machinery.

Westmoreland Manganese Corporation held a stockholders meeting recently to discuss plans for winning government approval for completion of their plant at Batesville, Arkansas. The plant was closed when the government cancelled its manganese production contract with Westmoreland on the ground that the company "defaulted" on the terms. The government had spent $2,600,000 on plant construction while the company had spent $750,000. The government had agreed to advance $3,500,000.

The Missouri Geological Survey has listed 283 properties in Howell and Oregon counties, Missouri where brown-iron ore deposits were found. However, only about one out of every 10 deposits might be mined and then only under careful conditions because of low grade, reports the Survey. No exceptional deposits were discovered and not enough ore was located to classify the section as an iron mining district. The Survey did indicate that there was more iron ore in that section of the Ozarks than had previously been known and plans are being made to survey the rest of the Ozark area in the future.

Extensive deposits of ilmenite and rutile have been located in the sands along the Gulf of Mexico in the vicinity of Panama City, Florida, according to Dr. J. Calver of the Florida State Geological Survey. Samples showed heavy mineral content up to 14 percent with about half of that as ilmenite and rutile.

International Minerals and Chemical Corporation's Achan mine near Bartow, Florida is back in operation on a five-day week after being closed since September 25th. The Achan produces 68 BPL rock, much of which is used by the Chemical Phosphates Department of International at the new *Bonnie* plant in Florida. Reduced demands for Achan rock necessitated the curtailment.

The government approved $1,000,000 in aid to mining groups searching for strategic minerals during the four months ended November 30, 1953. The DMEA signed 63 new contracts during the period. Minerals covered in the contracts were asbestos, copper, iron, lead, manganese, mica, monazite, thorium, tungsten, uranium, and zinc. The projects are in Alabama, Alaska, Arizona, California, Colorado, Georgia, Idaho, Montana, Nevada, New Hampshire, North Carolina, South Dakota, Utah, Washington, and Wyoming. During that period 87 applications were turned down and 37 others were withdrawn.

A 304-page study of bauxite is the latest in a series of surveys of strategic materials which was sponsored by the National Security Resources Board. It was prepared by the U. S. Bureau of Mines and the United States Geological Survey. Among the subjects discussed are ores of bauxite, uses of end products, world reserves, production and distribution, mining and milling, substitutes, and tariffs. Copies may be obtained from the Superintendent of Documents, Washington 25, D. C., at $1.50.

Preliminary work has already begun on almost every phase of the overall construction program *Erie Mining Company* is conducting for a 7,500,000-ton taconite plant near Aurora, Minnesota. At the mine itself, work on access roads has been started in order that stripping may be commenced for the pit in the near future. The new plant site has been entirely cleared, while about 500 acres have been cleared for the housing facilities. At the harbor, a contract has been let for construction of the 1,300-foot northeast breakwater. The right-of-way is now being surveyed for the railroad which will carry pellets from the concentrating plant to the loading dock, and work is under way on the three-mile railroad adjacent to the harbor.

The *Globe Iron Company* which operates the *Cornell* mine at Iron Mountain, Michigan, produced a total of 19,705 gross tons of iron during the 1953 shipping season. A total of 44,596 tons were shipped in 1952, and 38,777 tons in 1951.

Pickands Mather & Company has announced definite plans for the construction of an iron ore concentrator at its *Tioga* property west of Grand Rapids, Minnesota. This plant will include a crushing and screening unit located in the pit and a conveyor over 2,000 feet long to a surface plant consisting of a washing, screening, heavy media, and cyclone. Completion is set for May 1955.

The Iron Range 1953 shipping season from the head of the Great Lakes ended on November 28th when the Benjamin F. Fairless left Two Harbors, Minnesota, for lower lake ports. Shipments for the season were the highest in history with 95,844,449 gross tons being handled by all lake carriers. Of this total in excess of 44,000,000 tons was shipped by the *Oliver Iron Mining Division* of *U. S. Steel Corporation*.

Work on *Reserve Mining Company's* multi-million dollar taconite plant at Beaver Bay, Minnesota is being stepped up with a definite deadline of July 1, 1955 as the time for full production. Decisions on mill design and equipment requirements are being drawn up based upon the pilot plant operation at Babbitt, Minnesota.

Season's shipments from Great Northern Railway docks at Allouez, Wisconsin totaled 32,330,700 tons. The last boat to be loaded was the Joseph H. Thompson. The 1953 season's shipments exceeded 1952's by over 6,500,000 tons.

World's Largest Two-Crawler Shovel

The largest two-crawler shovel ever built is making mining history on the western end of the Mesabi Iron Range where it is being used to dig and to load overburden. This is the Marion 191-M, 10-cubic-yard shovel which is pictured above loading 30- to 40-ton rail cars. The equipment was designed for tough digging, and has a production potential of over 600,000 cubic yards per month. It loads trucks in the 50-ton size in three or four passes.

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J. R. Simplot Completes Colorado Uranium Shaft

The J. R. Simplot Company has completed its new main inclined shaft at its uranium-vanadium mines in Bull Canyon, Montrose County, Colorado, according to Louis P. Gaggini, superintendent. Completion of the 8-by-8 foot incline to a depth of 580 feet wi l speed lateral development of ore discovered and delimited in 1953 by surface PortaDrilling. Several development headings are now in ore and regular shipments are being made.

The company is also carrying out a $100,000 exploration program on nearby claims and has shipped its PortaDrill from Simplot's Gay phosphate mine in Idaho to speed drill exploration.

George A. McHugh, manager of mines for Simplot, is in charge of the uranium operations from his Boise, Idaho headquarters.

Rocky Mountain Area Will Have HMS Iron Ore Mill

The Schroeder Mining Company is building the first HMS plant in the Rocky Mountain area to beneficiate iron ore. The new plant, now under construction at Guernsey, Wyoming, is scheduled for operation in the late spring. Ore will be mined near Sunrise and trucked to the new mill, according to Paul Schroeder, vice president. Feed to the mill will be screened at ¼-inch and the undersize stockpiled. Oversize plus-¼-inch and minus-1¼-inches will be treated in a No. 3 M Wemco Mobilmill with a 6-by 6 foot-drum separator. 50 tons per hour of concentrate will be recovered from 75 tons per hour fed to crushing plant.

Standard Uranium Formed To Purchase Big Buck

Charles A. Steen, discoverer of the Mi Vida uranium mine, has reportedly sold his interest in the Big Buck claims to Joseph W. Frazer, co-founder of Kaiser Frazer Corporation. The Big Buck claims adjoin the Mi Vida claims staked by Mr. Steen and incorporated by him into the Utex Mining Company. Sale price was about $2,000,000. Frazer plans to form a new company, Standard Uranium Corporation, and spend $500,000 for exploration at the Big Buck. Mr. Steen will be a director of the new company.

On December 5, 1953 Charles Steen and William McCormack of Dove Creek, Colorado, secured an option on the Big Buck claims from Dan Hayes, Donald Adams, Joseph Adams, and Eddy Saul. Dan Hayes located the Big Buck claims in 1948. These were the first claims in the area but their true value was not known until the Mi Vida discovery in late 1952. Ore shipments have been made from the claims for the last eight months.

AEC Improves Edgemont Uranium Ore Buying Depot

Railroad car deliveries of ore are now being accepted at the U. S. Atomic Energy Commission's uranium ore buying depot at Edgemont, South Dakota. Facilities have been expanded to handle increased tonnages of ore and to provide a means of obtaining rail haulage rates for shippers producing ores in areas a greater distance from the station, such as those operating in eastern Wyoming.

American Smelting and Refining Company, ore buying agent for the Commission, recently completed an expansion program which included installation of mechanical sampling procedures and provided equipment for doubling the capacity of the plant. Crane equipment for unloading gondola type, flat or solid bottom railroad cars will make it possible for ore producers to alternate their means of shipping ore. In many cases shipment of ore by rail will reduce haulage costs for the shippers particularly for those operating at greater distances from the buying station and relatively close to rail loading facilities.

The following conditions have been set down for those using rail for shipment: railroad cars must be gondola type, flat bottomed and solid bed; routing must specify Chicago, Burlington and Quincy delivery and shipments must be consigned to American Smelting and Refining Company, Edgemont, South Dakota; rail freight must be prepaid by the shipper.

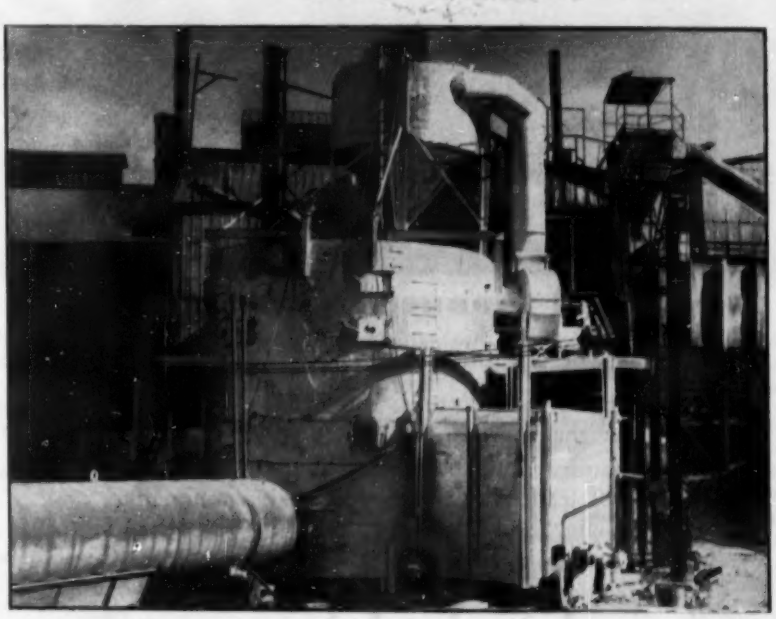
Golden Cycle Ships First Uranium Ore

The Golden Cycle Corporation is the newest uranium-vanadium shipper on the Colorado Plateau. First shipment of ore from the firm's United States Atomic Energy Commission lease on Dolores Rim two miles north of Uravan, Colorado has been made to the Vanadium Company of America's Naturita Mill, according to Ben Slothower, superintendent of uranium developments. Golden Cycle has completed, under contract to Eugene Bishop, its 635-foot vertical shaft, cut a sump, completed the shaft station and started drifting on the 600-foot level. On the surface, a new headframe and 50-ton ore bins have been erected and a new hoist and compressor installed. The deeply buried ore to be mined by Golden Cycle was discovered by the AEC by surface diamond drilling.

COLORADO

E. L. Brown and Company have reopened the *Ibex* mine on Johnny Hill, Lake County, Colorado. The company is working through the No. 2 shaft which had been closed since 1949. The Ibex is well known as a producer of high-grade gold ore. The new company is seeking oxide gold ore, according to Mr. Brown.

Resurrection Mining Company has started exploration on the 500-foot level of its Helena shaft in Iowa Gulch south of Leadville, Colorado. Resurrection has finished shaft repairs and unwatering of the shaft. Two shifts of miners are employed and three of pump men with 650 gallons of water per minute being pumped, according to A. M. MacKay, assistant manager. All work at the company's *Resurrection* and *Yak* mines is now



Courtesy Lee Photo, Durango, Colo.

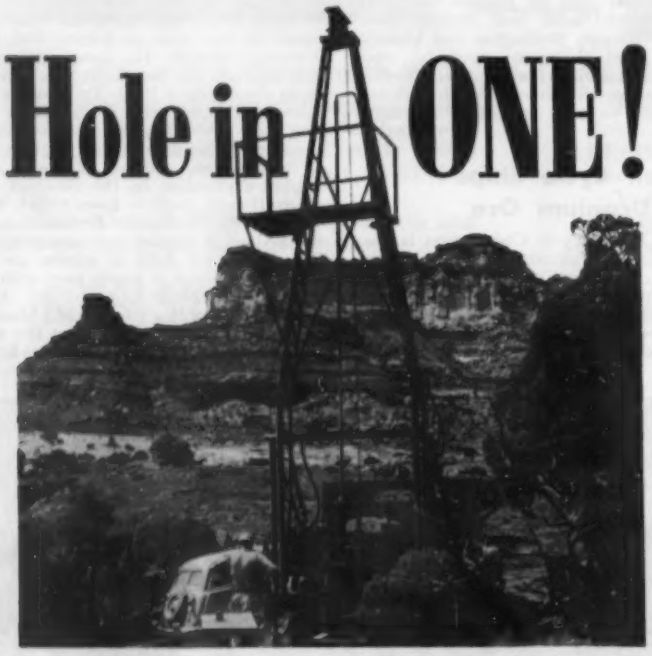
VCA's New Roaster Works A 24-Hour Day

Vanadium Corporation of America has started operating No. 3 roaster for ore bearing uranium and vanadium at its Naturita, Colorado mill. The roaster, the third installed, increases mill capacity by 80 percent. It is 20 feet in diameter and contains 6 suspension brick arches as hearths. Ore is fed into the top and continues down, dropping from hearth to hearth as the temperatures are raised to achieve the desired roast by the time the material is quenched at the bottom. Butane gas is being used to fire the roaster, which runs 24 hours a day.

United States Government Expansion Programs for Six Strategic Minerals as Reported by the General Services Administration

Commodity	Year of goal	Goal	Base year	Expansion between base and goal years	Total goal year	1953 Available	Deficit or surplus in goal year
				(In millions of pounds)			
Cobalt	1955	27	10	11	21	18.3	—6
				(In short tons)			
Copper	1955	2,270,000	2,031,000	94,000	2,125,000	2,084,000	—145,000
				(In short tons)			
Fluorspar (acid grade)	1955	300,000	145,000	180,000	325,000	325,000	+ 25,000
				(In millions of pounds)			
Molybdenum	1954	70	28.5	30	58.5	56.3	—11.5
				(In short tons)			
Titanium	1955	22,000	500	6,700	7,200	2,300	+ 14,800
				(In millions of pounds of contained metal)			
Tungsten	1954	40	9	27	36	37.9	—4

Note: Base year is 1950, except for titanium which is 1951. GSA said that the total copper expansion of 2,125,000 short tons depends on the price and trade policy prevailing between now and the goal year.



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being done by lessees who operate the mine and mill on a one-shift-per-day basis. Robert Jones of Leadville is leasing the mine. In 1953 the Resurrection mined only 79,045 tons of ore for company account. However, over 100,000 tons of ore were milled with the difference from custom shippers.

The *Uranium Ore Producers Association* has moved to new offices in the Butler Building, 808 South Ninth Street, Grand Junction, Colorado.

SOUTH DAKOTA

For the second time in 10 years, the Tinton mill at Tinton, South Dakota has burned down. Estimated losses for the latest fire are $200,000. The mill previously was destroyed in January 1943. The mill, owned by the *Black Hills Tin Company*, was under lease to the *Bald Mountain Mining Company* of Trojan, South Dakota and was being used to recover lithium oxide concentrate. According to Richard Stoehr, general manager, operations have been discontinued and there are no future plans for production of lithium oxide.

UTAH

The last sections of a 125-foot short wave communications tower at the *Mi Vida* mine of the *Utex Exploration Company, Inc.* have been completed. The tower facilitates communications with the mine and drill rigs. At Big Indian, a private power supply assures operaitng. The transmitter is housed in a room blasted out of the cliff. In addition to the Moab station, several company cars are equipped with two-way radio equipment.

Coeur d'Alene Silver Giant, Inc. of Kellogg, Shoshone County, Idaho has acquired an interest in the 30-claim *Hot Rock* group in the Big Indian uranium mining district of San Juan County, Utah. Development plans have not been announced. Harry G. Alway of Kellogg is president of the firm.

WYOMING

More than 100 placer claims have been filed with the Big Horn county clerk at Basin, Wyoming. Bentonite exploration operations will be started on the more than 16,000 acres.

United States Geodetic Survey maps of the uranium ore area in Fremont County, Wyoming are being prepared by the topography division of the survey in Denver, Colorado. The maps are based on an aerial survey made in 1949 and a field survey finished in 1952.

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Shaft Job Averages 8 Feet Per Day at Halfway Mark

An overall job average of more than eight feet per day has been maintained during the deepening of Bunker Hill and Sullivan Mining and Concentrating Company's Crescent shaft near Kellogg, Idaho. An average of more than nine feet per day was made during the month of September 1953.

The shaft is being deepened from the old sump bottom depth of 1,275 feet to the proposed depth of 3,275 feet for deeper development of the mine. The halfway mark in sinking was reached and excavation for the 2,000 station was under way early in December of 1953.

The Crescent is three-compartment and has outside timber dimensions of 15 feet by 5 foot 10 inches. The 8- by 10-inch timber sets are hung on 5½-foot centers.

Sinking is on a three-shift basis. The four-man bottom crew use two D. A. 30's mounted on a pneumatic column for drilling. A Riddel shaft mucker, with a ¾-cubic-yard clamshell, is used for mucking. Intermediate bucket dumping is provided by a hinged chute in the skip compartment. The muck is transferred to a pocket and then later hoisted the rest of the way in the skip during drilling operations on the bottom. A wooden bulkhead is placed over the shaftmen while they are drilling to protect them from any spill.

J. B. Haffner is vice-president and general manager of Bunker Hill and Sullivan, and S. W. McDougall is mine superintendent.

IDAHO

An 8,500-foot mill-level adit has been completed at *Sullivan Mining Company's Star* mine in Shoshone County, Idaho. It connects the underground mine shaft with *Hecla Mining Company's* surface plant and the Star mill at Burke. The mine was opened in 1924 through a 9,000-foot crosscut from the 2,000-foot level of the Hecla shaft at Burke. Workings since have been extended upward about 3,000 feet and downward about 2,300 feet. The new 10-by-11-foot adit will lower ore handling costs and eliminate pumping of 100,000,000 gallons of water annually from old Hecla workings. Primary crushing equipment will be installed underground.

Thirty new Fagergren flotation cells and six Agitair cells are being installed in *Sunshine Mining Company's* mill on Big Creek, Shoshone County, Idaho. Ten of the Fagergrens will make up the primary silver-copper circuit and the remainder a lead-iron bank. The Agitairs will serve as a retreatment unit for the high-grade product, depressing any excessive lead content for return to the lesser circuit. The modernization project is scheduled for completion around February 1.

Whitedelf Mining and Development Company is running its mill on a two-shift basis on development ore from the main Pearl vein ore body opened on the mine's new 800-foot level. The shoot was reached about 925 feet from the shaft, which had been deepened 400 feet. Values are in lead and silver. Work has been carried on with aid of a $60,125 DMEA loan. Compton I. White, Jr., of Clark Fork, Idaho, is president and manager; Compton I. White, former Idaho congressman, is secretary-treasurer.

Hecla Mining Company proposes to explore another large area at the eastern end of the Coeur d'Alene mining region in Shoshone County, Idaho. The new area is on the north side of the Osburn fault, east of Mullan. Hecla, aided by *Newmont Mining Corporation* and *New Jersey Zinc Company*, currently is carrying on deep development of the *Atlas* property south of the fault. Under a proposed operating agreement with the recently consolidated *Princeton*, *Eastern Lead*, and *Fortune* properties, Hecla would obtain a 60 percent interest in ground covering nearly two miles along the strike of the Deadman's Gulch shear, a major mineralized structure identified within the last few years by the United States Geological Survey. Directors of the consolidated Princeton firm have approved the proposal.

Lucky Friday Silver-Lead Mines, Inc., is planning to spend about $450,000 to complete its new three-compartment shaft and install new hoisting facilities. The new shaft extends from the mine's bottom 2,400 level to 70 feet above the 1,800 level. It will be raised through to the main adit as soon as possible to permit increased production and exploration of the firm's expanded holdings and adjoining properties under operating agreements. Current output is more than 100 tons of silver-lead-zinc ore daily. The main ore body on the bottom level has been opened about 350 feet in good ore. John Sekulic of Mullan, Idaho, is president of the Shoshone County mine.

Expiration date of *Hypotheek Mining and Milling Company's* $70,410 DMEA contract at its Pine Creek district property in Shoshone County, Idaho, has been extended until August 4, 1954. About $30,000 remains unexpended. Work has been suspended until spring on the exploration project, but lessees are planning to sink a 50-foot winze on a known ore shoot and to unwater the 300-foot shaft under contract with the company.

Silver Buckle Mining Company of Wallace, Idaho has been granted a DMEA exploration loan of $114,750 for a $229,500 project at the three-claim property of *Vindicator Silver-Lead Mining Company* east of Mullan. The Vindicator adjoins *Luck Friday* mine on the east. Silver Buckle has agreed to develop Vindicator for half of any ore found. The DMEA project includes an 800-foot shaft and extensive lateral development therefrom. Work is to be completed within two years. Dr. F. E. Scott is president of Silver Buckle. The firm recently purchased two tracts of land totaling 1,996 acres southeast of Moab, Utah from Salt Lake City interests headed by W. H. Cranmer. Payment will be in shares of Silver Buckle stock. The tracts are near the uranium operations of *Utex Exploration Company*. Development plans have not yet been formulated. Mr. Cranmer is president of *New Park Mining Company* which will be associated with Silver Buckle in the development of Vindicator.

Pacific Northwest Metals & Minerals Conference

The 1954 Pacific Northwest Metals and Minerals Conference will be held in Portland, Oregon April 29, 30, and May 1 at the Multnomah Hotel. Jointly sponsored by the three Northwest sections of the American Institute of Mining and Metallurgical Engineers—the North Pacific, Columbia, and Oregon sections—it will offer one session each on mineral industries education, geology, extractive metallurgy, iron and steel, and ground water as an industrial mineral. Two sessions each will be held on physical metallurgy and industrial minera's. Other activities include a program for the ladies, local plant tours, an industrial minerals luncheon, a metals branch luncheon, and a grand banquet. Shown above are some of the conference organizers: left to right, William W. Wiltschko, metallurgist, Vancouver Works, Aluminum Company of America, chairman of the metals branch; Francis X. Cappa, mechanical engineer, Aluminum Company of America, Vancouver, Washington, general chairman; Donald W. Johnson, carbon plant superintendent, Reynolds Metals Company, Troutdale, Oregon, in charge of activities and arrangements; Harold R. Seykota, engineer, Portland Gas & Coke Company; and A. O. Bartell, managing engineer, Raw Materials Survey, Portland, Oregon, in charge of publicity.

Clinton Gundersen and Ira Lambert have suspended their mining operations at the *Hanni Mining Company* property near Mackay, Idaho until spring. Just before snow drove them out, they made an initial 12-ton test shipment of tungsten ore to *H. M. S. Milling Company* of Salt Lake City.

Sunset Mines, Inc. is taking over the Pine Creek district property of *Sunset Minerals, Inc.* in the Coeur d'Alenes, Idaho in a reorganization aimed at getting the original Sunset firm out of financial difficulties brought about by the drop in zinc and lead prices. Most of the 26 men employed recently were engaged in driving exploration crosscuts under contract into adjoining properties of *Lookout Mountain Mining & Milling Company* and *New Era Mines* from the 1,200-foot level of the Sunset shaft. One Sunset stope was being worked and output milled. Additional pumping facilities were installed recently to cope with a heavy water flow in the Lookout heading, which partially flooded the working level. C. B. Merritt of Seattle is company secretary.

Claud D. Fox has reopened two old tunnels on the Clancey claims near Bonners Ferry, Boundary County, Idaho, and found four feet of high-grade copper ore. He plans to build an access road next spring and to go into production.

Ten men are mining lead-zinc-silver ore from three stopes in a new ore body discovered recently at the property of *Hope Silver-Lead Mines, Inc.*, near Clark Fork, Bonner County, Idaho. Ore is being treated in the company's concentrator, to which a zinc circuit was added, and concentrates trucked to the *Bunker Hill* smelter at Kellogg. Production is from a new tunnel 400 feet above the main adit. The vein was found by surface bulldozing. Glenn C. Lee of Kennewick, Washington, newspaper publisher, is company president, and Elmer Shields, mine foreman.

Northwest Gypsum Company has leased its lime deposit on the Idaho side of the Snake River near Nyssa, Oregon to Melvin Taylor and sons, Jack and Everett, who plan to operate the pits throughout the winter.

Victory Mines, Inc., of Boise, Idaho has been incorporated by Rex Butler, Howard Kimber and Mary Edwards Reigle, all of Boise, to carry on mining activities in Custer and Lemhi counties.

Four diamond drilling machines were put to work on the new 2400-foot level at the *Hecla-Atlas* deep development project east of Mullan, Shoshone County, Idaho with both horizontal and downholes planned. Other exploration is suspended pending completion of the diamond drilling. More than 2,000 feet of drifting and crosscutting had been done since completion of shaft sinking last June. *Hecla, Newmont* and *New Jersey Zinc* mining companies are financing the project. L. J. Randall is president of Hecla.

At the *Vulcan-Galena* mine in the Coeur d'Alene silver belt west of Wallace, Idaho, *American Smelting and Refining Company* is driving a 400-foot raise to open the 2,400-foot horizon. The mine is being developed upward from the 3,000 level, scene of several ore strikes after the old Galena shaft was deepened from the 840-foot point. Three headings are being driven on the 3,000 level and development ore at times exceeds capacity of the 150-ton mill on the property. Several thousand tons of ore has been stockpiled. A raise to the 2,800 level was in good silver-copper ore all the way and development work is proceeding on that level. A winze from the 600 to the 1,600 level in old Galena workings is being unwatered to determine if it can be reclaimed for use as a manway. J. E. Berg of Wallace is manager of the company's Northwest operations.

Ione Mining Company of Wallace, Idaho suspended operations until spring at its property east of Murray, Shoshone County. Mine workings had been prepared for production of about 25 tons of lead ore daily when rain and snow made the mine road impassable for large ore trucks. Otto Nordquist is president and manager.

National Silver Lead Mining Company has reopened the caved portal of its middle tunnel on Big Creek in the Coeur d'Alenes, Idaho and is cleaning up the 1700-foot tunnel for examination purposes.

Lemhi County, Idaho is experiencing a boom in mining claim locations and prospecting. In one recent month, 130 location notices were filed with the county recorder. Most were for rare earth deposits but one covered iron deposits on Poison and Allison Creeks.

L. A. Thompson, Spokane building contractor and former eastern Oregon gold miner, has succeeded W. M. Fredericks of Spokane as president and general manager of *Idaho Goldfields, Inc.* The company is sinking a winze on a vein at its property in Fourth of July Canyon, east of Coeur d'Alene, Idaho and is stockpiling lead-silver ore.

The Idaho State Land Board has approved quartz leases for Arthur B. Johnson and Alfred Vanderpool of St. Maries, Latah County, and Martin Stein, Idaho City, in Boise County. Ray Bellows of Redding, California obtained a state lease for medicinal clay. J. A. Simplot Company of Boise sought a lease to mine silica from land owned by the *Lava Hot Springs Foundation* in southeastern Idaho.

Sunset Minerals, Inc., a lead-zinc producer in the Pine Creek district of the Coeur d'Alenes, Idaho, is considering the voluntary sale, lease, or exchange of its assets to a new corporation as a way out of financial difficulties brought about by low lead-zinc prices. The firm reported an operating loss since March, 1952. C. B. Merritt of Seattle is secretary.

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MONTANA

Amador Mining Company has completed half of a $31,900 DMEA copper exploration contract at the *Green Mountain* mine near Dixon, Montana. Work has included deepening of an incline

shaft and station cutting for a new 250-foot level. A 200-horsepower Diesel electric generator has been installed and mill rehabilitation is under way. Development ore is being stockpiled. Plans call for deepening the mine an additional 200 feet next spring. James F. Charlton of Missoula is president.

Queen Mining Syndicate of Drummond, Montana has incorporated under the name of *Copper Queen Mining Company*. The syndicate has been exploring the *Sunrise* copper mine near Hall, Granite County, under a $21,450 DMEA contract. Directors and officers of the new firm are James H. Mellen, Drummond, president; E. R. McLaughlin, Livingston, vice president; George D. Lyon, secretary-treasurer; Wellman A. Clark, Spokane, Washington, and William Howell, Drummond, directors.

The DMEA has terminated a $24,317 copper exploration contract with *Columbia Mining Company* in Lewis and Clark County, Montana, and a $10,215 thorium exploration agreement with *Elkhorn Mining Company* in Beaverhead County.

A car of uranium ore was shipped recently from the *Lone Eagle* mine near Clancy, Jefferson County, Montana, to *Vitro Chemical Company* at Salt Lake City, Utah, by A. H. Eiselein and associates of Boulder.

New Montana incorporations include *Deer Park Mines, Inc.*, by Oscar Sales, H. B. Reser, W. L. Cline, D. A. Nash and J. H. Morrow, Jr., all of Bozeman; and *Montana American Uranium Mining Company*, by S. E. Montgomery, William B. Howson and E. J. McCabe, Jr., all of Great Falls.

Cyprus Mines Corporation has concluded exploration at the *Water Hole* property east of Saltese, Mineral County, Montana, following 300 feet of tunnel work under contract with the U. S. Atomic Energy Commission. Development of the *Mineral King* mine, in the same county, has been suspended for the winter.

Radon Research Corporation, a mining company, has been incorporated at Boulder, Jefferson County, Montana, by Wade V. Lewis, J. T. Lewis and Theodore Nyquist. Wade V. Lewis is vice president of *Elkhorn Mining Company* which owns the *Free Enterprise* uranium mine.

Ed Hughes of Butte, Montana, is exploring a promising manganese ore body approximately 12 miles southeast of Dillon.

W. I. Gardner, operator of the *Jack-Group* mine, four miles west of Argenta, Montana, is presently engaged in sinking the main inclined shaft on the property to prospect the ore zone at depth. The main values are gold and oxidized lead minerals.

Williams Phosphate Company recently started producing phosphate from its property in Madison County, Montana's Upper Ruby area. A new mill at the portal of the mine adit has a capacity of 250 tons daily. Exploration and development work began in July 1951. A large ore body has been blocked out. Griff Williams is manager.

John Cole of Philipsburg, Montana is working the old *Black Pine* mine to recover tungsten minerals. This property is located 9 miles northwest of Philipsburg.

Lee and Ernest Shook are mining copper ore at their property about three

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miles west of Alta, Montana, after having completed building of an ore bin. The copper occurs in argillites close to the border of the Idaho batholith. The initial discovery work consisted of exposing the vein with bulldozer cuts. An inclined shaft is being sunk to check the values at depth.

Van Francinenn of Silver Star, Montana has erected a small mill three miles west of Silver Star to recover gold and silver values of the fine screenings from several dumps and gobs of mines in the immediate area. The mill is reported to be operating with favorable results.

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OREGON

Five shipments of chrome ore were made in 1953 by Burt Hayes from the old *Haggard* and *New* mine in Grant County, Oregon and treated in his new mill on Dog Creek, near John Day. Concentrates ran about 48.89 percent Cr203, with a 2.865 to 1 chrome-iron ratio.

The *John Day Mining Company* has been formed by A. F. Neuman and associates of John Day, Oregon to mine and mill chromite ore in eastern Oregon. They have taken over all equipment previously leased and owned by *Tri County Mining Company*, and are presently operating two mines—the *Dry Camp* and the *Norway*. The company recently purchased a compressor, loader, power shovel, and bulldozer. The former Tri County mill is being expanded, and additional facilities will enable it to conduct custom milling for various properties in the vicinity.

The United States Bureau of Mines is conducting a diamond drilling program at the *Queen of Bronze* mine near Takima, Oregon. The mine was reopened recently by *Waite Minerals, Inc.* (See MINING WORLD, December 1953, page 89.) Several drill holes are planned but the exact number depends upon results as the drilling progresses. Richard N. Appling is supervising the Bureau's work.

Work has been discontinued for the winter at the *Midnight* chromite claim operated by M. J. and Phil McShane of Grants Pass, Oregon. They have moved to the *Black Beauty* claim where they are sinking an incline to intersect the lowest of two caved adits dug by a previous operator.The new incline has already intersected and bypassed the face of the upper tunnel. A narrow stringer of high-grade chromite exposed in the old tunnels may be an extension of the chromite layer being mined by Everett McTimmonds on the adjoining *Lucky Star* claim.

Malheur Wonder Earth Company has been formed at Vale, Oregon to mine and process diatomite. The deposits are located in the Malheur Valley between Harper and Westfall, in a 55-square mile area. Negotiations are under way for a plant and machinery located near Harper and close to rail connections. Production is scheduled to start later this year. Don Galbreath is president; Robert Lytle, vice president; Kenneth Johnson, secretary; and Roy C. Rush, assistant secretary and treasurer.

Ray Summers of Canyon City, Oregon is reported to have discovered a vein carrying values in copper and gold, on a hill directly above the old *Standard* workings on Dixie Creek, Grant County, Oregon. An access road has been built to the property and Mr. Summers plans to continue development and exploration, by drifting, through the winter.

The old *War Eagle* quicksilver mine in Jackson County, Oregon is being reopened by James H. and Jesse A. Holtzclaw and S. A. Edwards who are now cleaning out the lower tunnel. They plan to do more exploration work as mining equipment is obtained. A small amount of mercury has been produced in a small retort consisting of three 1- by 8-foot tubes and smaller condenser pipes. The ore occurs in a fault zone that cuts through the Applegate (May Creek) schists. Brecicated chalcedony and schist fragments cemented by marcasite occur in the fault zone, with the cinnabar found in the matrix of the breccia and in the clay gouge.

Output of zirconium at the U. S. Bureau of Mines' Northwest Electro-development Laboratory at Albany, Oregon, is being maintained at about 22,000 pounds monthly. Hafnium also is being produced. Entire output goes to the U. S. Atomic Energy Commission.

WASHINGTON

Pacific Northwest Alloys, Inc., has reduced its Spokane, Washington operations to one ferrosilicon furnace because of poor marketing conditions for ferrosilicon and ferrochrome. H. B. Megill is executive vice president and general manager.

Northwest Chemical and Refining Company has been organized to build and operate a $200,000 zinc oxide plant in Spokane, Washington. Barnard Wilcox of Wallace, Idaho, metallurgist, and associates have optioned a plant site and obtained a building permit. The plant would use a fuming process developed by Wilcox at a Wallace pilot plant. The plant would treat about 50 tons of concentrate daily and produce 32 to 35 tons of zinc oxide.

The old *Germania* mine near Fruitland, Stevens County, Washington would be operated by *Penticton Tungsten Mines, Ltd.*, a new British Columbia firm, under a lease and purchase option offer accepted by directors of *Tungsten Mining and Milling Company* of Spokane. Purchase price is $125,000 within 10 years, with $25,000 payable in 1954, 1955, and 1956 in royalties or cash. The Canadian firm was organized recently to develop a tungsten-bearing tactite ore body on Riordan Mountain west of Penticton, but testing indicated the overall ore grade was too low. W. A. Lougheed of Penticton is president, and Wellman Clark of Spokane is secretary-treasurer. Tungsten Mining and Milling is headed by Paul H. Casey of Spokane.

The world's largest aluminum stretcher has been put into operation at *Kaiser Aluminum & Chemical Company's* Trentwood rolling mill in the Spokane Valley, Washington. The 300,000-pound machine has a pulling strength of 5,000 000 pounds. The stretcher, built by Watson-Stillman Company, relieves residual stresses in aluminum plate caused by heating and rolling, permitting machining of the sheet with a minimum of distortion. The machine handles plate 40 feet long and two inches thick.

Silver Dollar Exploration and Development Company of Spokane, Washington is making a public stock offering to obtain funds which will be used in a search for new mineral and oil resources in the Pacific Northwest. The firm is headed by Elmer E. Johnston who is also president of *Silver Chieftan Mining Company*.

Duval Sulphur & Potash Drills For Copper-Moly

The Duval Sulphur and Potash Company has acquired an option to purchase the properties of Coronado Mines, Inc., about 12 miles northeast of Nogales, Arizona, and a diamond drilling program has been launched. The first hole was started on November 25 and the second on December 2.

All diamond drilling will be done by Joy Manufacturing Company. The number of holes to be drilled will be determined by results obtained as work progresses. Depth of holes will vary from 500 to 1,500 feet.

Coronado's holdings cover 10 properties with a total of 163 unpatented claims. Among these is the Red Mountain mine, a group of 33 unpatented claims, where the present exploration work is in progress. The other properties are known as Buena Vista, Bennett, Rankin, Larson, Martha Washington, Red Top, King, State Group, and Golden Rose.

The Red Mountain is a low-grade disseminated deposit containing principally copper with some molybdenum. The others contain principally copper, with some molybdenum, and are vein deposits with some lower grade disseminates ores found on the Buena Vista and Bennett.

Diamond drilling at the Red Mountain will determine the average grade of ore and the approximate tonnage. If results are favorable, diamond drilling at other mines in the Coronado group probably will be undertaken.

Headquarters for Duval Sulphur and Potash Company are located in the Mellie Espersion Building at Houston, Texas. Milton Leon of Tulsa, Oklahoma is president and general manager of Coronado Mines, Inc.

Maglia Drift Mine To Be Ventilated By Drill Hole

The Maglia Mining Company of Maglia, California, is presently drilling a ventilation hole to a depth of 940 feet to intersect a drift of 3,000 feet from the portal. The churn drill, operated by Lassen Pump Company of Chico, California, is drilling a 16-inch hole which will later be enlarged to 30 inches for use as a secondary exit from the mine.

The company incorporated in 1893, and has been one of the richest ancient gold bearing placer channel mines with over $6,000,000 recorded production. Plans are to extend the new workings to the mammoth channel about 600 feet distant.

H. G. Holmes is president, and Charles Richmond is advisory consultant.

Inspiration Consolidated Copper Company at Inspiration, Arizona, is remodeling its coarse crushing plant. Plans call for the installation, within the near future, of two 7-foot standard heavy-duty Symons cone crushers and four Ripl-flo five- by 12-foot screens to replace four 8K Gates gyratory crushers and eight 48-inch Symons horizontal disc crushers. Final production figures for 1953 are expected to show that a higher percentage of output was obtained by open-pit methods and less from underground operations than in 1952. Inspiration employs approximately 1,000 men in its various departments. P. D. I. Honeyman is general manager; H. C. Weed, assistant general manager.

Phelps Dodge Corporation, Copper Queen Branch, is moving approximately 57,000 tons of material daily in the development of its *Lavender* open-pit mine at Bisbee, Arizona. All material is handled by trucks. Over 40,000,000 tons of waste must be removed before actual production can be started late in 1954. Within a few months of that time, the new concentrator now under construction is scheduled to be operating at its full capacity of 12,000 tons of ore per day.

The old *Oatman* gold mine at Oatman, Arizona is reported to be reopening. Mrs. E. S. Scott of Los Angeles, California is said to be readying the mine for production and hopes to erect a custom mill in the district eventually.

Eagle Picher Company's mine in Pima County, Arizona has been reassessed at only $3,100 instead of the $200,000 value it was assessed at before its closing. The state tax commission has ruled that since no work is being done at the mine the property should be assessed only on the value of its unworked claims. Similar reductions are expected on all patented claims held by the 34 zinc-lead mines which were forced to close because of low metal prices. Counties are expected to make up the loss eventually by increasing both valuations and tax rates on other types of property.

Kenneth J. Hines of San Diego, California is reported to be seeking fluorspar ore assaying plus-50-percent CaF_2. He believes he can handle the entire output of any suitable Arizona mine, and is particularly looking for a pool of mines capable of producing a stockpile of 500,000 tons of ore.

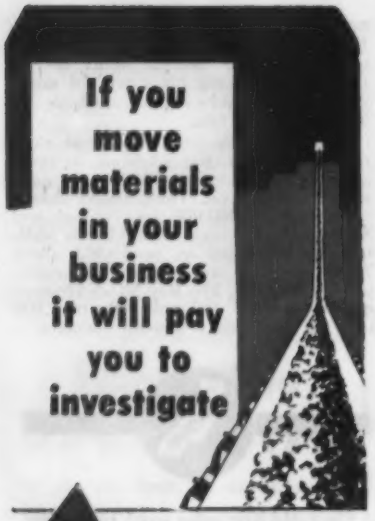
Ray Mines Division, Kennecott Copper Corporation, Ray, Arizona, is operating 21 trucks, each with 34-ton capacity, in its open pit. These trucks handle approximately 400,000 tons of ore and 850,000 tons of waste monthly. In addition the company is producing about 73,000 tons of ore monthly by underground methods. The Ray Mines Division employs a mine and mill crew of 1,100 men. A. P. Morris is general manager.

The *Gold Reef* mine south of Ludlow, California has been leased by Robert C. Burns who expects to begin operations shortly.

The *Mugwump Mining Company, Inc.*, formed by Mr. and Mrs. Cecil Vivian, has acquired the following mining properties in the Alleghany district of California: the *Exchange* mine, *American Flat, Gold Bug, Live Yankee*, and *Young America*. The mines adjoin one another. A new adit is being driven at the Exchange mine, a new road has been built on the American Flat side of Oregon Creek, and a mill site has been blasted. Compressors and other machinery and supplies are being installed during the winter season. This activity constitutes a revival for the old mining town of Forest which had almost become a ghost town.

Cutting a Truck Road Into a Mountain

Ably demonstrating what man, with his machines, can do to push nature's obstacles around to suit his ends is the operator of a Caterpillar Diesel-powered tractor, equipped with a bulldozing attachment. The machine is building a truck road into a pumice stone mining site for the United States Pumice Company near Leevining, California. The road is being constructed at an 8,000-foot elevation, where pumice is mined in chunk form and hauled to a nearby plant for cutting.



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Although containing ore reserves, the new owners of the *Lava Cap* mine near Grass Valley, California have decided to abandon the mine because of high operating costs. The mine was acquired by a Canadian firm, *New Goldvue Mines Limited*, from *Lava Cap Gold Mining Corporation* and transferred to a wholly owned subsidiary, *Keystone Copper Corporation*, in California. After a year of investigation, however, the firm has decided to dismantle and sell the mining equipment, machine shop equipment, supplies, and a large portion of the mining plant, leaving intact on the property a headframe, compressors, hoists, and other equipment for unwatering and reopening the underground workings if conditions become more favorable for the gold mining industry.

Natomas Company continued to operate six dredges in the Folsom district of California during the nine-month period ending September 30, 1953. It had been anticipated that one of the units which capsized and sank might be shut down during the year, but recovery was maintained at a slight margin above operating costs and an advantage was gained in retaining the six-unit operation. The dredge in question was originally built in 1912, and had been operating in the area adjacent to its present location since 1922. Net returns from the district vary only slightly from the preceding year. There was a three percent increase in gross production which was offset by a five percent increase in costs.

The shaft is down 170 feet at the *White Eagle* mine of *Piute Tungsten Mills, Inc.* in Kern County, California. A drift has been driven about 200 feet, and tungsten ore is being stoped above the 170-foot level. Roads have been built, and a camp established during the two years of development work. A 50-ton tungsten mill close by consists of a primary and secondary crusher, three tables, and a set of rolls. The mill operates on a 24-hour shift. About 3,000 tons of ore is stockpiled for milling this winter. The mine is located at an elevation of 6,700 feet.

L. B. Spaulding, L. B. Spaulding, Jr., and Howard W. Meador are continuing development work at their tungsten property near Ramona, California. About six miles of access road has been built, many bulldozer cuts made, and two underground workings started. A small pilot plant is in operation, consisting of a small crusher, rolls, elevator, impact screen, fine ore bin, and a Dunham Economy 12-foot concentrating table. The property totals 360 acres, 240 of which are leased, and the balance mining claims. The principal tungsten mineral discovered to date is scheelite, ($CaWO_4$) occurring in a series of quartz veins in a series of altered sediments. Intruding these sediments is a large body of quartz-diorite and an extensive swarm of aplite dikes. Recently a blackish mineral was found associated with scheelite at one point. This was identified by Dr. R. H. Jahns of the California Institute of Technology as ferberite. ($FeWO_4$)

Kaiser Aluminum & Chemical Corporation of Oakland, California and *Kennecott Copper Corporation* of New York have concluded a stock agreement permitting Kennecott to purchase $16,250,000 worth of a new series of convertible preferred stock in Kaiser and 100,000 shares of common stock from the founding stockholders of Kaiser.

The *Morris Ravine Mining Company* located near Oroville, California has completed a new 1½-compartment shaft 315 feet deep on a 22° incline. Five men are employed at the operation drifting through gravel thought to be a part of the old Cherokee Channel. Mr. J. H. Sharpe is president.

Three University of California scientists have been able to synthetically produce several mineral compounds never before made in a laboratory. Basically, they were able to change igneous and sedimentary rock into metamorphic rock from which they obtained small amounts of silicates. Prof. John Verhoogen, Dr. W. S. Fyfe, and Prof. F. J. Turner duplicated the metamorphic process by sealing sedimentary limestone and calcium in a cobalt-steel container and then subjecting it for 24 hours to heat and pressures equivalent to those six miles deep in the earth.

The 1,100-acre holdings of the *Union Blue Dot Mining Company* near North Bloomfield, Nevada County, California have been sold to Mr. and Mrs. Harold Helland. Extensive gold mining was done in this property in earlier days. Most recent use of the Union Blue Tunnel was by the *Relief Hill Mining Group*. The new owners may consider the mining possibilities of the property eventually, but at present it will be used for cattle, timber, and planting.

NEVADA

Richard Blakey of Reno, Nevada was the sole bidder for the holdings of *Goldfield Deep Mines Company of Nevada* which was auctioned to satisfy a mortgage foreclosure by *Newmont Mining Corporation*. Mr. Blakey's offer of $25,000 brought three lode mining claims and one fraction formerly held by Deep Mines. They are the *Florence*, the *Red King*, and the *White Horse*, and the *Fraction*. Also included were all improvements and equipment on the ground including a 100-ton mill.

A revolutionary prospecting tool, a mobile magnatometer, was successfully used by the *United Geophysical Company* of Pasadena, California in the discovery of three iron ore bodies in south-

CORRECTION

Through a serious error in facts, the American Smelting and Refining Company was incorrectly reported on page 47 of the December 1953 issue to have borrowed $17,000,000 from the Reconstruction Finance Corporation to place the Silver Bell open-pit copper mine in production and that one of two pits would be for oxide ore.

MINING WORLD regrets its mistake and any embarrassment it may have caused the company.

The true facts are that ASARCO financed the entire project and that while one of the pits has been named "Oxide" that name has nothing to do with the type of ore.

east Pershing County and northeast Churchill County, Nevada. Originally mounted on a truck, the unit is now in a power wagon which will enable it to get over very rough ground. It can cover 200 miles a day where a hand-born instrument could only cover one mile a day.

Greenan Placers, a subsidiary of *Natomas Company*, again encountered an area of low value gravels during the first six months of its operation in 1953. The nine-month period showed both a decrease in yardage handled and a 20 percent reduction in value per cubic yard compared with the first nine months of 1952. However, values had increased considerably at the end of the period. The company operates a connected bucket line dredge in Lander County, Nevada.

The *Modoc Mining Company* is shipping tungsten ore to the Reiley custom mill in Silver City. The open pit mine is 18 miles north of Gerlach, Nevada and is under the supervision of F. T. Quiet of Reno.

The *New World Exploration Company* of Reno, Nevada has moved its offices to Los Angeles, California. Having completed a series of geophysical surveys in Wyoming, they are relocating in order to better handle aerial geophysical work centered near Los Angeles.

The *Alladin* lead-silver mine near Elko, Nevada expects to resume normal operations by May after being shut down for the severe winter months. The mine is operated by *New World Exploration Company*.

Frank Notterman and A. R. Tout of Sacramento, California, have leased the *Easter Bonnet* claims, the *Sykes* claims, and others in an area 16 miles south of Sodaville, Nevada. They are moving in to start production of tungsten ore from the group which totals 42 claims.

Western Metals Company, Inc., has opened the *Karp* property 11 miles northeast of Mina, Nevada. Joe Harris is general manager of the open pit and underground tungsten mine. Ore has been shipped to mills at Kinkead and Sodaville.

Pearson Garret has leased a group of claims from Marty Vidovich and has arranged to ship the tungsten ore to *Nevada Tungsten Corporation's* custom mill at Sodaville. The ore along a lime-granite contact is open pitted one and one half miles west of Luning, Nevada, with ore occurring in garnet. Some ore assays 3.0 to 4.0 percent WO_3.

The *Thrasher* tungsten mine, also known as *Stormy Day* mine, was purchased by a Reno syndicate. Some buildings have been moved onto the property, located south of Gerlach, Nevada, and plans call for a mill to be erected there. At present exploration drifting is being carried out.

Tungsten is being mined at the old *Lucky Boy* mine west of Hawthorne, Nevada. Initial shipment of 30 tons of about 1.0 percent WO_3 has been shipped to the Kinkead mill. Bill Oliver of Hawthorne is leasing the property from Mrs. June Babcock, also of Hawthorne.

The *Continental Iron Ore Company* has shut down its open-pit iron operation located in Brunswick Canyon just east of Carson City, Nevada. The shut down reportedly was caused by a lack of ore.

Four fluorspar properties in Nevada are now supplying custom ore for *Kaiser*

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Aluminum & Chemical Corporation's mill at Fallon. Bill Cirac, Charles A. Joseph, and James Lee are shipping from their leased *Box Canyon* property 22 miles north of Stillwater where they are mining from a stope 600 feet from the adit portal. The fluorspar vein is estimated to be about two feet wide. A Dixie Valley property and another located in Iowa Canyon near Austin are providing about 200 tons monthly. Both are operated by Joe and Bob Keller. In Venice Canyon near Ione, C. J. Smith and R. L. Tiefel are mining fluorspar for Kaiser processing, while the company's own *Kaiser* mine near Broken Hills is also reported to be producing steadily.

Black Rock Mining Corporation, a subsidiary of *Wah Chang Corporation*, is maintaining a production of 300 tons of tungsten ore per day at its *Lincoln* mine at Tempiute, Nevada. At this time last year, production at Lincoln was largely by open-pit methods, but, because of metallurgical problems in milling the ore which occurred near the surface, open-pit operations were curtailed in May 1953. Underground operations on a larger scale then began and a production of 300 tons per day was reached in October. Work is under the direction of Joe Strutzel, general manager, and Jim Perkins, general superintendent, with the assistance of William McClintock, mine superintendent, George Green, mill superintendent, and George Peck, chief engineer.

Argentum Mining Company of Nevada which has operated mining properties in the Candelaria area of Mineral County, Nevada, for many years recently won a decree to quiet title to 12 mining claims. The company had brought suit against Francis Figg-Hoblyn and other defendants for allegedly locating claims on property owned by the plaintiff. The judge upheld Argentum's contention that Figg-Hoblyn locations were made on validly located claims held by Argentum.

Alpine Mining Company which operated the *Noonday* tungsten mine 55 miles southeast of Wells, Nevada, has recently acquired an additional claim—the *High Ore No. 7*—on which tungsten ore is reported to have been exposed.

A new $65,000 manganese ore milling plant is in operation at Truth or Consequences, New Mexico. A year ago *Tower Mining and Refining Company* had purchased a flotation mill from Blanchard Hanson with a capacity of 48 tons per day producing 42 percent concentrate. The new Tower company plant is a HMS unit with a capacity of 30 tons of 20 percent concentrate per hour. The ore will be transported to Engle, 17 miles east for shipment to Deming.

Freeport Sulphur Company has moved its offices from Carlsbad to Hobbs, New Mexico. The company has prospected for potash for about 2½ years in an area 32 miles east of Carlsbad. A discovery has been reported by the company but no production plans have been announced.

Bids for leasing 440 acres of land near Carlsbad, New Mexico for potash production have been sought by the federal government. The land is in Eddy County 20 miles northeast of Carlsbad.

Obituaries

Walter I. Garms, 67, died on December 29, 1953, at his residence in San Mateo, California. Prior to his retirement in 1951, he was assistant general manager of Ray Mines Division of Kennecott Copper Corporation, and in direct charge of its reduction plant at Hayden, Arizona.

He entered the employ of the Ray Consolidated Copper Company, the predecessor of Kennecotts' Ray Mines Division in 1910. He first worked at the mine for a few months and then transferred to the milling department at Hayden, where (except for two years of military service in World War I) he remained until his retirement, working his way up through the mill organization to general mill foreman in 1915, mill superintendent in 1926 and assistant general manager of Ray Mines Division in 1945.

Mr. Garms was interested in all phases of milling operations but particularly so in problems pertaining to fine crushing and fine grinding, as to which he carried on many experiments, participated in many technical discussions, and wrote several articles embodying his views. He was an able and efficient administrator and executive.

Pope Yeatman, 92, described as the dean of American engineers by the American Institute of Mining, died at his home in Chestnut Hill, Pennsylvania on December 5. Mr. Yeatman was a holder of the William Lawrence Saunders Gold Medal, presented to him in 1934, and had helped to develop the Guggenheim Exploration Company mining interests in Chile, Alaska, and China while chief engineer for the firm. During World War I he had directed the nonferrous metals department of the War Industries Board, for which he was awarded the Distinguished Service Medal. He had been retired for the last ten years.

H. Cayford Burrell, 50, chief geologist of the party which discovered the Cerro Bolivar iron ore deposits in Venezuela five years ago, died while on a business trip in Pittsburgh, Pennsylvania November 9. Mr. Burrell was manager of raw materials development for the Columbia-Geneva Steel Division of the United States Steel Corporation.

Lewis E. Young, 75, consulting mining engineer and former president of the American Institute of Mining and Metallurgical Engineers, died in Pittsburgh, Pennsylvania, on December 27. A consulting engineer since 1939, Dr. Young had taught at the Colorado School of Mines and was director of the Missouri School of Mines and Metallurgy from 1908 to 1914.

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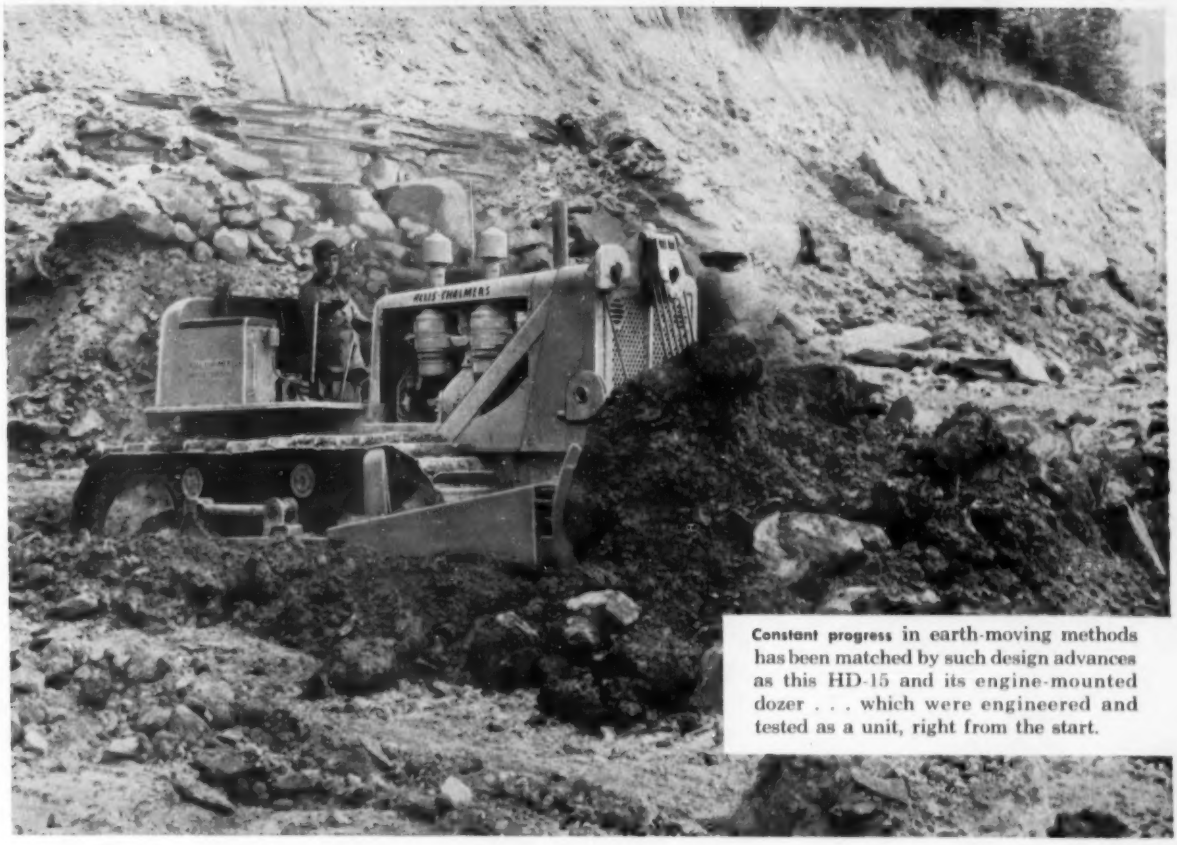

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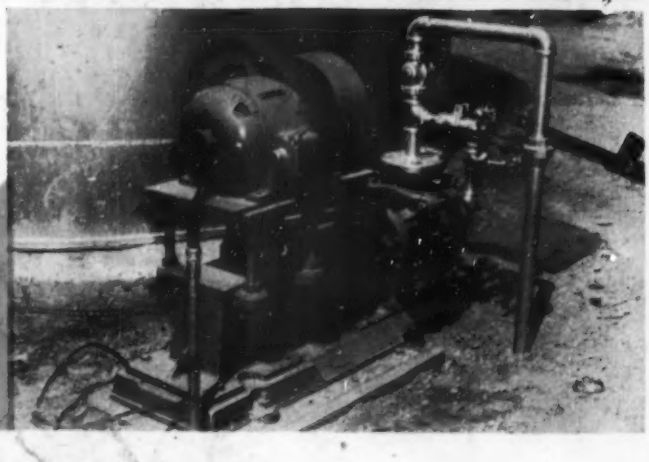

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